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CONSTRUCTION QUALITY CONTROL PLAN FOR OPERABLE UNIT 1 (OU 1) SITE 4 AND  
SITE 5 NWS EARLE NJ  
12/1/1997  
FOSTER WHEELER ENVIRONMENTAL CORPORATION

**U.S. NAVY NORTHERN DIVISION  
REMEDIAL ACTION CONTRACT (RAC)  
CONTRACT NO. N62472-94-D-0398  
DELIVERY ORDER NO. 0034**

**CONSTRUCTION QUALITY CONTROL (CQC) PLAN  
FOR  
REMEDIAL ACTION AT OPERABLE UNIT 1 (SITES 4 AND 5)  
NAVAL WEAPONS STATION EARLE  
COLTS NECK, NEW JERSEY**

**December 1997**

Prepared by

Foster Wheeler Environmental Corporation

Revision

0

Date

12/11/97

Prepared By

P. Mooney

*for*  
*PETER MOONEY*

Approved By

A. Aziz

*[Signature]*

Pages Affected

All

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## **1.0 INTRODUCTION**

This document presents the Construction Quality Control (CQC) Plan for the Remedial Action (RA), which consists of the installation of a final cover system on the Landfill Sites 4 and 5 located at the Naval Weapons Station (NWS) Earle in Colts Neck, New Jersey. This CQC Plan will be considered part of the contract documents for this project. The purpose of this plan is to specify methods, procedures, and frequency of inspection and testing activities to verify the quality of the installation of the final cover system on Site 4 and 5 Landfills in accordance with the Construction Drawings and Technical Specifications presented to the U.S. Environmental Protection Agency Region II (USEPA) and the New Jersey Department of Environmental Protection (NJDEP). The data and information collected during this program will be used as the basis for the Certifying Engineer to certify that the cover system has been installed in accordance with the Construction Drawings and Technical Specifications.

The activities addressed by this plan consist of the construction of multi-layered final cover systems and associated surface water management. Two distinct areas are to be capped: Site 4 involving Wetland Restoration and Site 5 with a Skeet Range and paved/parking areas. The cover systems feature, in ascending order, a bedding/gas management layer, a very flexible polyethylene (VFDE) geomembrane, a geotextile cushion fabric, a granular drainage layer, a non-woven geotextile, select fill and topsoil. At Site 5 areas for roadway and parking receive a stabilization fabric and aggregate surface course while paved areas receive stabilization fabric, aggregate base and asphalt surface course. Sideslopes and drainage channels feature riprap protection.

The Quality Control (QC) program outlined in this plan was developed to verify that the placement and quality of the materials are in compliance with the Construction Drawings and Technical Specifications.

This CQC Plan was prepared in accordance with the guidelines presented in the USEPA Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities (EPA/600/R-93-182).

## **2.0 PROJECT ORGANIZATION AND STRUCTURE**

### **2.1 General**

The organizations involved in the Landfill Sites 4 and 5 remedial action include regulatory agencies, the U.S. Navy Northern Division (the Navy), and the Remedial Action Contractor (RAC). The regulatory agencies are the United States Environmental Protection Agency Region II (USEPA) and the New Jersey Department of Environmental Protection (NJDEP). Representatives of the Navy will act as Remedial Project Manager Navy Technical Representative (RPM NTR), Construction Navy Technical Representative (Construction NTR), Design Navy Technical Representative (Design NTR), and RAC Contracting Officer's Technical Representative (COTR). Representatives of the RAC will act as the Certifying Engineer, QC Manager and Site Quality Control Representative (SQCR).

The role of CQC personnel is described within this CQC document.

### **2.2 Organization and Responsibilities**

The following section describes the responsibilities and lines of authority within each organization involved in the project and construction quality control. A project organizational list is provided on Table 2-1 and a project organizational chart is shown on Figure 2-1.

#### **2.2.1 U.S. Navy Northern Division**

The U.S. Navy Northern Division (Northdiv), as facility owner, will designate an employee of NWS Earle's office of the Resident Officer In Charge of Construction (ROICC) as the Construction NTR to manage the RAC. The RAC is responsible for daily landfill construction operations and providing CQC personnel to oversee these operations.

Northdiv has the authority to select and dismiss organizations charged with design, CQC, and construction activities, and to accept or reject Construction Drawings and Technical Specifications, CQC Plan, reports, recommendations of the RAC's Certifying Engineer, and the materials and workmanship of the RAC.

##### **2.2.1.1 Construction NTR**

The Construction NTR will be an employee of NWS Earle's ROICC office and will be the Navy's local representative for the project. The Construction NTR has the responsibility of coordinating construction and CQC activities so that they are conducted in accordance with Construction Drawings and Technical Specifications. He interfaces with the RAC's Construction Representative, SQCR, and QC Manager regarding daily operations and conformance of construction activities with Construction Drawings and Technical Specifications. His responsibilities include the following:

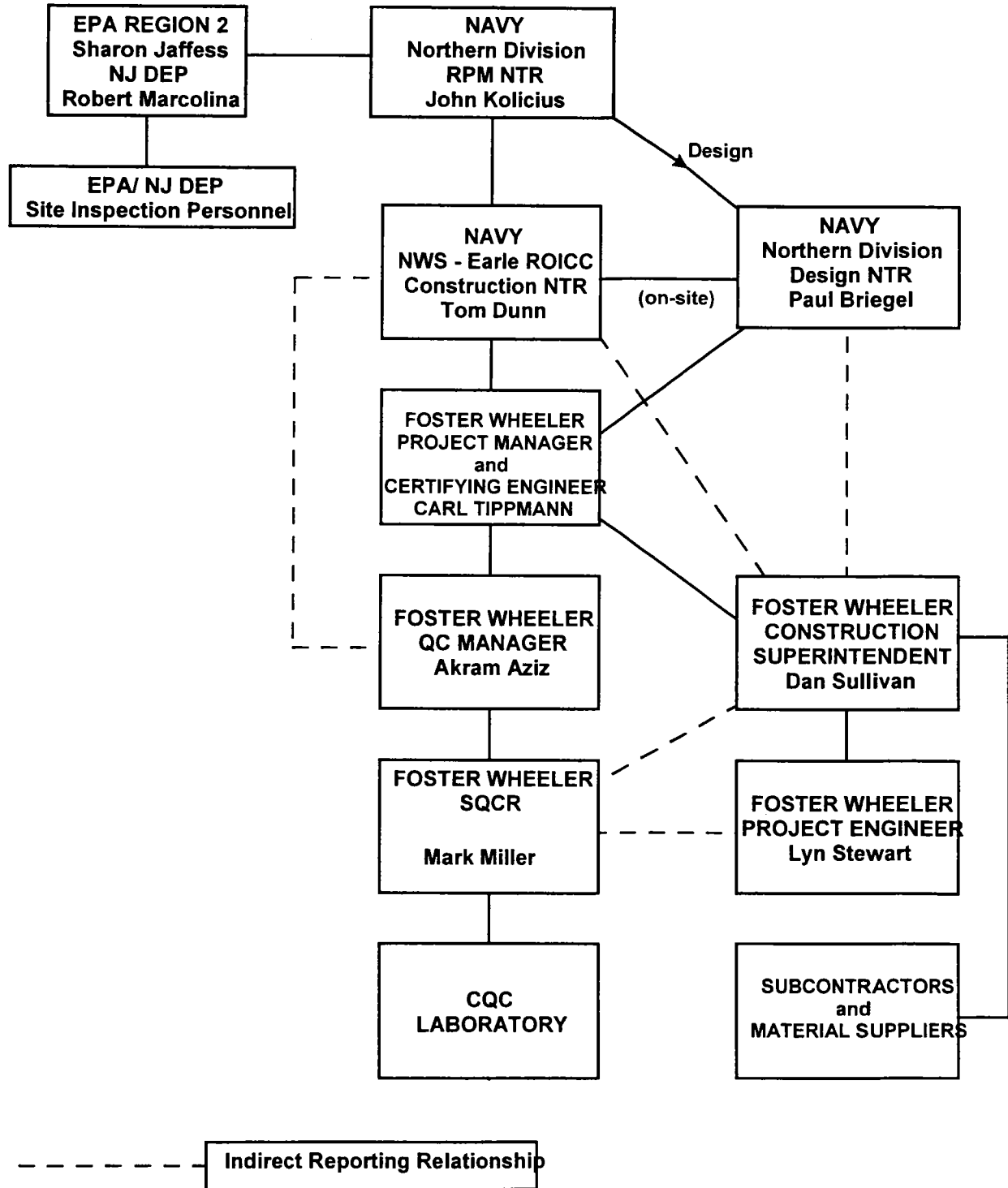
- Ensuring that the project scope and objectives are defined and that procedures, schedules, budgets and manpower requirements are established.
- Establishing project procedures, instructions, lines of communication, working relationships, controls, and reporting requirements within the project.

**TABLE 2-1**  
**PROJECT ORGANIZATION LIST**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE**

<b>Function</b>	<b>Firm</b>	<b>Contact</b>	<b>Phone No.</b>
RPM NTR	NAVFAC, Northdiv Environmental Dept.	John Kolicius	(610) 595-0567, Ext. 162
Design NTR	NAVFAC, Northdiv Civil Design	Paul Briegel	(610) 595-0590
COTR	NAVFAC, Northdiv Civil Design	Paul Briegel	(610) 595-0590
Construction NTR	NWS-Earle ROICC Office	Tom Dunn	(732) 866-2048
Regulatory Agencies	USEPA NJDEP	Sharon Jaffess Robert Marcolina	
RAC Project Manager and Certifying Engineer	Foster Wheeler Environmental Corp.	Carl Tippman	(215) 702-4044
RAC QC Manager	Foster Wheeler Environmental Corp.	Akram Aziz	(215) 702-4077
RAC Project Engineer	Foster Wheeler Environmental Corp.	Lyn Stewart	(770) 825-7206
RAC Construction Superintendent	Foster Wheeler Environmental Corp.	Dan Sullivan	(508) 397-2019
RAC SQCR	Foster Wheeler Environmental Corp.	Mark Miller	(215) 702-4000
QC Laboratory	TBD	TBD	



**FIGURE 2-1  
CQC ORGANIZATION CHART  
LANDFILL SITES 4 & 5 REMEDIAL ACTION  
COLTS NECK, NEW JERSEY**



- Providing direction and guidance to the site project team with respect to their individual project responsibilities.
- Processing submittals, Requests for Information (RFIs) and Field Change Requests (FCRs) generated by the RAC and transmitted by the QC Manager.
- Reviewing CQC documentation to verify that corrective action has been satisfactorily completed when deviations are made from the Construction Drawings and Technical Specifications.

#### 2.2.1.2 Design NTR

The Design NTR will be an employee of Northdiv's Civil Design Department and will be the Navy's technical point-of-contact (POC) for the project. In particular, the Design NTR is responsible for coordinating the resolution of design engineering issues with the RAC.

#### 2.2.1.3 RPM NTR

The RPM NTR will be an employee of Northdiv's Environmental Department and will be the Navy's environmental POC for the project. In particular, the RPM NTR is responsible for interfacing with regulatory agencies (USEPA and NJDEP) and for coordinating the resolution of environmental issues with the RAC.

### 2.2.2 Remedial Action Contractor (RAC)

Foster Wheeler Environmental Corporation is the Remedial Action Contractor for Landfill Sites 4 and 5. The RAC is responsible for implementation of construction activities in strict accordance with design criteria, Construction Drawings, and Technical Specifications using the necessary construction procedures and techniques. The RAC is also responsible for formulating and implementing a Construction Quality Control (CQC) Plan which addresses the rules and responsibilities of RAC project and CQC personnel, and outlines inspection and testing procedures to be conducted by CQC personnel and/or subcontractors.

Other RAC responsibilities include:

- Furnish the materials and equipment and utilize the specific means, methods, techniques, sequence, or procedure of construction as indicated in the Construction Drawings and Technical Specifications. In case of deviation, submit an RFI or FCR (as described in Section 5.0) to the QC Manager for evaluation and transmittal to the Construction NTR.
- Procure subcontractor services. Submit a scope of work description for these services to the Construction NTR for acceptance.
- Prepare Daily Reports as described in Section 5.1 and submit these reports to the Construction NTR.
- Initiate, maintain, and supervise all safety precautions and programs in connection with the work.
- If conflict, error, or discrepancy is found in contract documents or existing field conditions differ materially from those indicated, report in writing (via an RFI) to the QC Manager and

Construction NTR before proceeding to obtain a written interpretation or clarification from the Navy.

- Notify in writing the QC Manager and Construction NTR of any subsurface or latent physical conditions encountered which differ materially from those specified or indicated.
- Implement the Foster Wheeler CQC Plan and establish a chain of command.
- Provide the construction superintendent who will be responsible for the field construction operations and the Site Quality Control Representative (SQCR) who will be responsible for the implementation of the Foster Wheeler CQC Plan.
- Maintain at the site a record copy of As-Built Drawings, a copy of specifications, addenda, written amendments, change orders, work directive changes, field test records, field orders, and written interpretations and clarifications. Upon completion of the work, deliver these records to the Construction NTR.

#### 2.2.2.1 Certifying Engineer

The Certifying Engineer is responsible for determining if operations are conducted in accordance with approved Construction Drawings, Technical Specifications, and permits, and for reporting deviations from these plans and procedures to the Construction NTR.

The Certifying Engineer will also be responsible for assuring that quality control inspections and/or sampling and testing activities are conducted as specified in the CQC Plan. He reports to the Construction NTR regarding QC data documented by the QC Manager.

Submittals, correspondence, or other relevant project documentation will be submitted to the Certifying Engineer by the RAC's QC Manager.

Specific tasks to be performed by the Certifying Engineer include:

##### Submittal Review

The Certifying Engineer will review the RAC submittals as listed in the register appended to the Technical Specifications. The Register of Submittals is included in Appendix A. The Certifying Engineer will provide the Construction NTR with a memo outlining the documents reviewed and any comments or concerns within 10 working days of receipt of each submittal. The submittals will be provided by the RAC to the Certifying Engineer through the QC Manager.

##### Oversight

The Certifying Engineer will provide limited on-site oversight/inspection during construction of the final cover system as described previously. Oversight will consist of field inspections during critical construction sequences, such as installation of the VFPE geomembrane, to verify that construction is proceeding in accordance with the Construction Drawings, Technical Specifications, and the CQC Plan. The Certifying Engineer will notify the Construction NTR in the event of any observed non-compliance and recommend appropriate action.

The Certifying Engineer will be available for daily communication with the QC Manager to discuss CQC activities and their results and to comment upon the RAC's Daily Reports. The Certifying Engineer will also review and comment upon the Weekly Summary Reports prepared by the QC Manager prior to submittal of these reports to the Construction NTR.

### Project Meetings

The Certifying Engineer will be available to attend or participate in all weekly project QC and management team review meetings, either in person, if present in the field, or via teleconferencing. He will also participate in appropriate progress meetings.

### Final Report

At the completion of the project, the Certifying Engineer will prepare and certify a Final Report documenting the CQC activities conducted during the construction of the final cover system. Conformance of the RA to the Construction Drawings and Technical Specifications will be documented in the Final Report. The contents of the Final Report are further described in Section 5.6.

#### 2.2.2.2 QC Manager

The QC Manager reports to the Certifying Engineer and interfaces with the Construction NTR and the RAC's SQCR. Specific tasks to be performed by the QC Manager include the following:

- Witness the RAC's construction activities and inspect the ongoing and completed work.
- Observe personnel and equipment working on site for cross-checking of the RAC's Daily Reports.
- Monitor the RAC's SQCR testing program for adherence to the requirements of the Construction Drawings and Technical Specifications.
- Perform QC Manager testing in accordance with the CQC Plan. This includes the performance of field tests, the collection and shipment of samples for laboratory testing, the preparation of inspection and testing reports as described in Section 5.2, and the reporting of any QC deficiencies to the Construction NTR and Certifying Engineer.
- Prepare and submit to the Construction NTR Weekly Summary Reports, as described in Section 5.3.
- Work in conjunction with the SQCR to establish and maintain a Rework Item List of work that does not conform to Construction Drawings and/or Technical Specifications. Track and monitor the items on the list to assure the rework inspection and testing activities and frequencies are in accordance with the contract requirements.
- Receive, review, and forward to the Certifying Engineer those submittals requiring Government approval.
- Receive, evaluate, and distribute the RFIs and FCRs received from the SQCR.
- Coordinate, facilitate, and prepare and distribute minutes for the weekly project QC and progress meetings.

- Monitor the SQCR's maintenance of As-Built Drawings, as described in Section 5.5.
- Participate in pre-final and final inspections of the completed work, prepare and maintain a detailed punch list, and verify that punch list items have been properly corrected.
- Collect samples for or perform QC Manager testing outlined in Table 4-1.
- Inform the Construction NTR, RPM NTR, Design NTR in order of availability of any site visit by regulatory agencies.
- Supervise and direct SQCR(s) if necessary due to increased work load.

#### 2.2.2.3 Site Quality Control Representative (SQCR)

The RAC's SQCR reports to the QC Manager and interfaces with the RAC's Construction Superintendent and Project Engineer.

The SQCR is responsible for coordinating inspection and surveillance activities. The SQCR or his delegate will monitor site activities on a full-time basis. The results of inspections and surveillances will be documented in the Daily Reports. The SQCR will also be responsible for:

- Implementation of the Foster Wheeler's CQC Plan.
- Performance of CQC inspection and field tests and preparation of inspection and testing reports as described in Section 5.2 and listed in Tables 3-1 and 3-2.
- Collection of samples for CQC laboratory testing and review of tests results.
- Preparation of Non-Conformance Reports, as described in Section 5.4.
- Maintenance of the latest applicable Construction Drawings and Technical Specifications with amendments and/or approved modifications at the job site and assure that they are used for shop drawings, fabrication, construction, inspections, and testing.
- Maintenance of As-Built Drawings as described in Section 2.5.4. The As-Built Drawings will be available for review at all times.
- Maintenance of a RAC-generated Submittal Register, ENG Form 4288, for the duration of the contract. A review of this Submittal Register will be performed monthly. Appropriate actions will be undertaken should slippages or other changes so necessitate. The initial Submittal Register is provided in Appendix A of this CQC Plan.
- Review shop drawings and/or other submittals for compliance with the contract requirements prior to their submission to the QC Manager for review, action, and transmission to the Construction NTR.
- Establish and maintain in conjunction with the QC Manager a Rework Item List for work that does not conform to Construction Drawings and/or Technical Specifications. Track and

monitor the items on the list to assure the rework inspection and testing activities and frequencies are in accordance with the contract requirements.

- Assist the Construction NTR, Certifying Engineer, and QC Manager at the pre-final inspection and final acceptance inspection.
- Maintain a dated photographic log of the project.

## **2.3 Project Meetings**

Progress meetings will be held to review current project status and enhance coordination and communication. Weekly progress meetings will be conducted during construction. Additional meetings, including problem or work deficiency meetings, will also be conducted as deemed necessary.

The weekly progress meetings will be coordinated and facilitated by the QC Manager and attended by the Construction NTR, the RAC's Construction Superintendent, Project Engineer, and SQCR. The Certifying Engineer will be available to attend the weekly progress meetings in person whenever present on site and via teleconferencing when not. The QC Manager will prepare and distribute the minutes of the weekly progress meetings. Weekly progress meetings will include discussions of the following, as applicable:

- Review of the previous week's activities and accomplishments.
- Review of the current week's activities.
- Discuss any potential problems.
- Discuss any existing construction problems and deficiencies, current status of resolution and action plans.
- Discuss status of submittals, Requests for Information (RFI), Field Change Requests (FCRs), etc.

## **2.4 Qualifications Of Key Personnel**

### **2.4.1 Certifying Engineer**

The Certifying Engineer assigned to the project will possess the following minimum qualifications:

- Bachelor of Science in Civil Engineering.
- Registration as a Professional Engineer (P.E.) in the State of New Jersey.
- Five (5) years experience in Civil Engineering design of landfill cover systems and a demonstrated competency for the certification of landfill cover systems or like installations.

### **2.4.2 QC Manager**

The QC Manager assigned to the project will possess the following minimum qualifications:

- Bachelor of Science in Civil Engineering.
- Three years of experience in civil engineering and demonstrated capability of thoroughly understanding Construction Drawings and Technical Specifications for landfill cover systems.

- Sufficient practical, technical, and administrative experience to execute and record inspection activities successfully. Such training will include demonstrated knowledge of specific field practices relating to construction techniques used for hazardous waste land disposal facility closures, knowledge of all codes and regulations concerning material and equipment installation, observation, and testing procedures, equipment, documentation procedures, and site safety.

## **2.5 Design Documents**

### **2.5.1 Purpose**

This section describes the procedure for controlling the receipt, processing, and distribution of design documents, including revisions to these documents in the form of field changes. It ensures that project personnel and subcontractors use the correct design document revision.

### **2.5.2 General Requirements**

The RAC will maintain a master control register which identifies the current revision of Construction Drawings, Technical Specifications, and other design documents transmitted to the job site. It is the responsibility of the RAC to receive, control, and distribute design documents and design document changes at the job site.

### **2.5.3 Receipt, Control, and Distribution of Design Documents**

The CQC Plan establishes a system for the receipt, control and distribution of design documents, including Construction Drawings and Technical Specifications, As-Built Drawings, subcontractor submittals, RFIs, and FCRs.

The RAC is responsible for design document control in the field.

### **2.5.4 Red-Line and As-Built Drawings**

The RAC is responsible for maintaining, on a day-to-day basis, a complete set of full-size red-line drawings, which are Construction Drawings reflecting the latest design changes and current as-built conditions. Red-line drawings conform to the following:

- Red pen is used to indicate all changes to design.
- Surveyed measurements of final locations and elevations are indicated.
- Subcontractor-installed temporary work, which is not removed, is indicated and appropriately marked.
- As revised subcontract drawings are received, they are checked to determine whether as-built details have been incorporated into the revision. If any further as-built details pertinent to these drawings exist, they are transferred onto the red-line drawings.
- Other clarifying documents are noted on the affected red-line drawings.

At the conclusion of construction, the RAC will prepare and provide to the Design NTR marked-up Construction Drawings which reflect final field conditions. The RAC will provide certification that the marked-up Construction Drawings reflect as-built conditions.

The As-Built Drawings will document lines and grades and conditions of each component of the final cover system. This will be accomplished using one of two means: topographical survey and field measurement. A topographic survey will be performed and certified by a licensed surveyor for the regraded landfill surface (just prior to placement of the bedding/gas management layer) and the final cover surface (following completion of the final cover systems). Field measurement will be utilized to document the final cover system components' (soils and geosynthetics) thickness, lines, and grades, including soil test, geomembrane test, and panel seam locations. Locations of tests will be recorded daily and referenced to the existing landfill baseline (station, offset). For soil components, the As-Built Drawings will include the plan dimensions of the component and locations of all soil test samples. For geosynthetic components, the As-Built Drawings will show the dimensions of all geomembrane field panels, the location of each panel, identification of all seams and panels with appropriate identification numbering or lettering, location of all patches and repairs, and locations of all soil test samples. Separate drawings will be prepared to show as-built cross sections and special features.

#### **2.5.5 Changes to Design Documents**

If a field situation requires clarification not provided by the Construction Drawings and Technical Specifications or necessitate a design change, the RAC will submit a Request for Information (RFI) or a Field Change Request (FCR) to the QC Manager. RFI are for specific requests (e.g., can RAC use different telephone poles for communication wiring?). FCRs are to identify in detail a problem and propose a solution (e.g., excess rock cut/fill - propose crushing to use as gabion aggregate). The QC Manager will transmit the RFIs and FCRs to the Construction NTR and the Certifying Engineer. The RFIs and FCRs will then be evaluated by the QC Manager and Certifying Engineer presenting a recommendation and a decision being reached by the Construction NTR. If this decision involves a design change, the Certifying Engineer, Design NTR, and RPM NTR will assess this change and, if necessary, the RPM NTR will direct the Certifying Engineer to have the QC Manager submit the FCR to USEPA and NJDEP for information or approval. The RFI/FCR form attached in Appendix A will be used for transmittal. Upon receipt of USEPA's and NJDEP's approval, the Construction NTR will issue the approved RFI or FCR for implementation. Figure 2-2 provides a flow chart diagram of the RFI/FCR process.

#### **2.7 Subcontractors**

The RAC's SQCR, and QC Manager will perform inspections, including a final inspection for acceptance of the work performed by subcontractors. These inspections ensure that the subcontractors are complying with the Construction Drawings, Technical Specifications, approved design changes, and subcontract documents. Such inspections are conducted daily during the subcontractor's activities. The RAC is responsible for all work and activities conducted or performed by their subcontractors.

The RAC may subcontract the various construction and test activities to organizations qualified to perform such activities. The RAC will retain the responsibility for construction quality control by performing inspections at intervals during construction and reserves the right to accept or reject items and installations as specified. The RAC will ensure that each subcontractor meets the technical and testing requirements of the Construction Drawings and Technical Specifications applicable to their scope of work.



Subcontract documents will include requirements for subcontractor submittals, inspections and tests which meet this CQC Plan. Requirements may be included in referenced Technical Specifications and Construction Drawings. Subcontract documents will include indication of submittal requirements which are prerequisite to specific field activities.

## **2.8 Submittals**

Submittals (shop drawings, samples, catalog cuts, certifications, manuals, part lists, inspection, test reports, etc.) relating to CQC are transmitted by manufacturers and subcontractors to the RAC and SQCR. A standard form, "Contractor Drawings & Information Submittal" (NORTHNAVFACEDNGCOM 4335/3), as attached in Appendix A, will be used for this transmittal.

Upon receipt of a submittal, the SCQR will review it for completeness and assign to each drawing, catalog cut, etc., an item number or control number; mark them accordingly; and enter these numbers on the appropriate transmittal form. The SCQR then logs all submittals in a Submittal Register as attached in Appendix A. The SCQR transmits the submittals to the QC Manager who, in turn, transmits it to the Certifying Engineer for review.

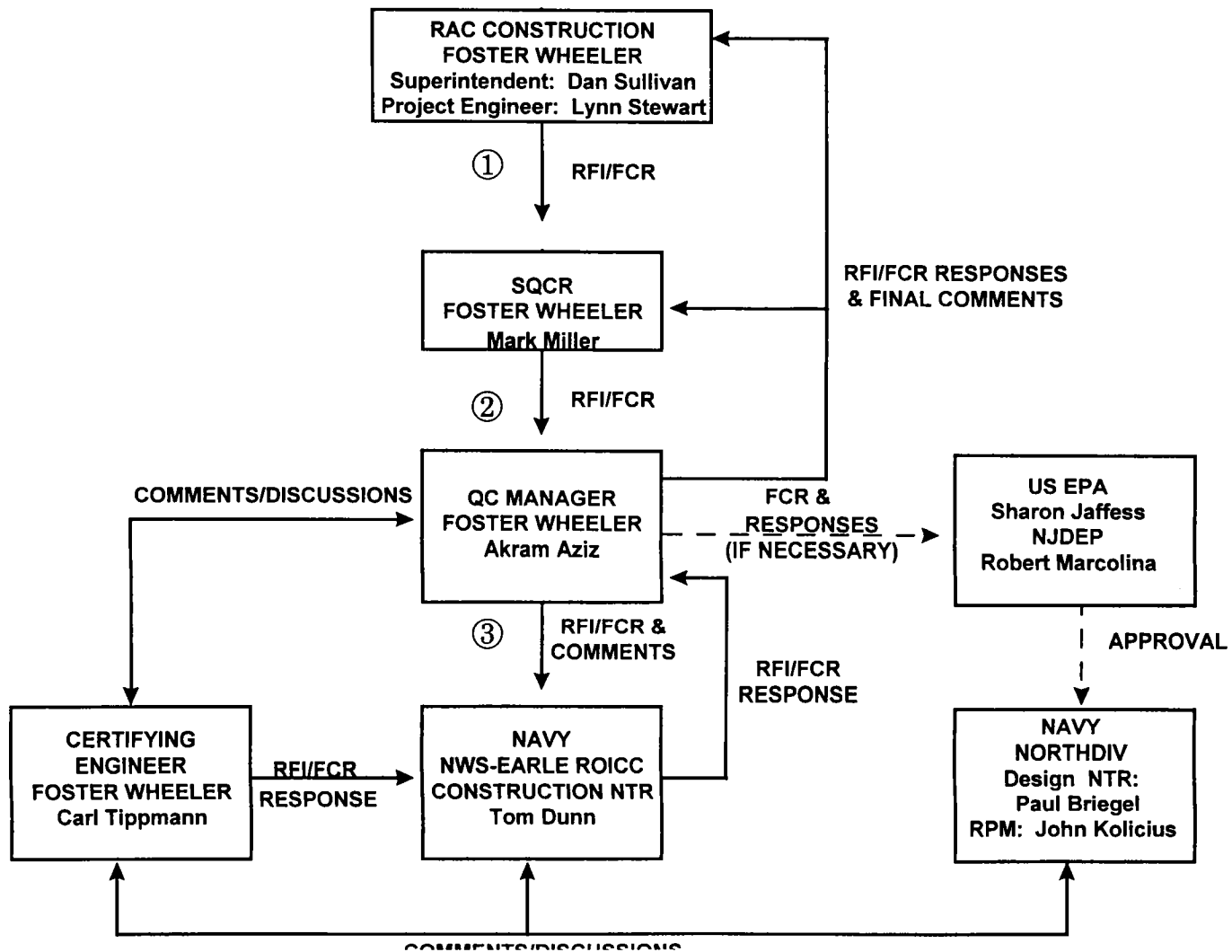
Once a submittal is received it is given a prompt review by the QC Manager and Certifying Engineer and transmitted to the Construction NTR with appropriate comments.

The Certifying Engineer stamps and signs the submittal and form with the following actions:

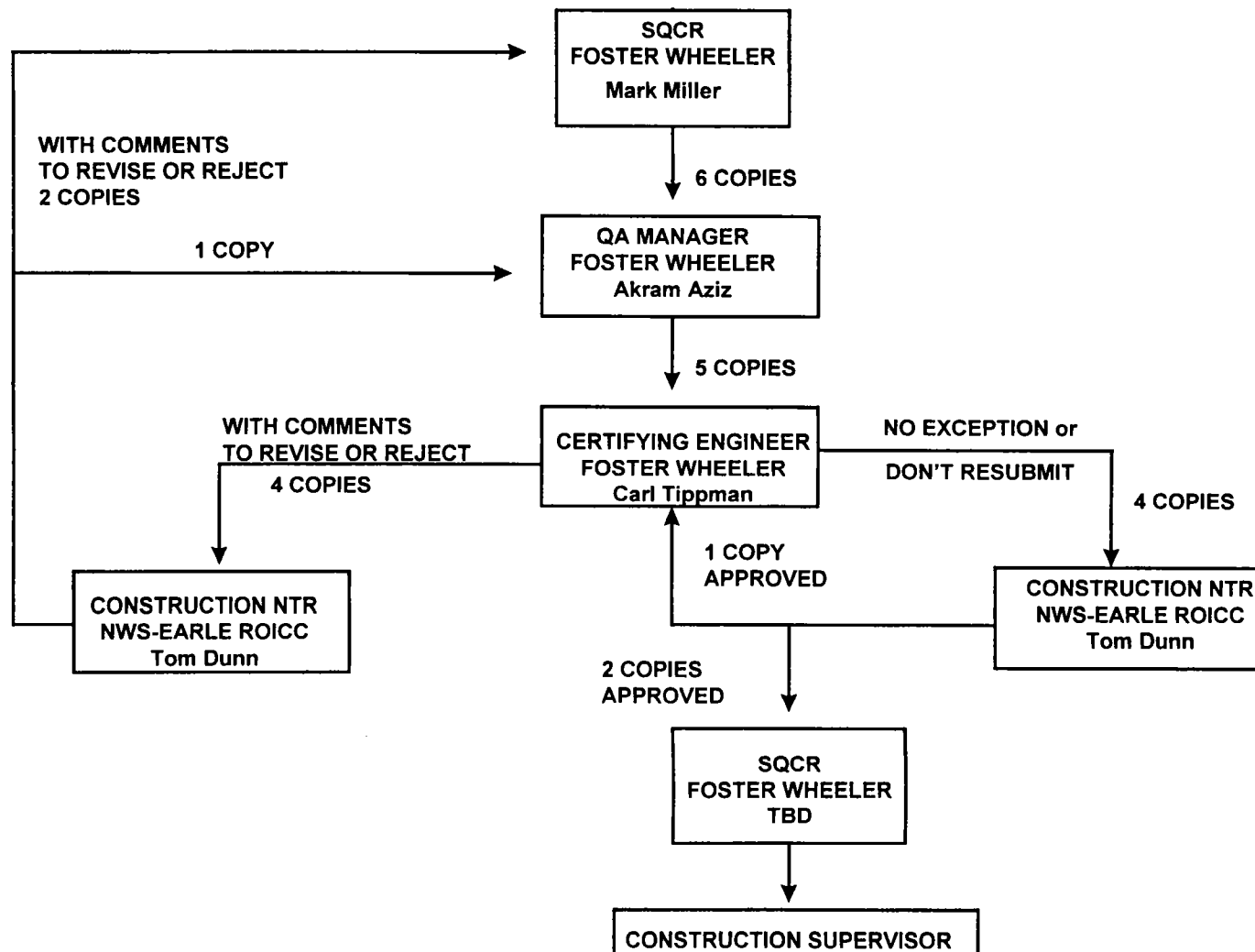
- "No Exception Taken, Do Not Resubmit" - This signifies conformance with the Construction Drawings and Technical Specifications.
- "Make Corrections As Noted, Do Not Resubmit" - This signifies general conformance with the Construction Drawings and Technical Specifications with minor changes required.
- "Make Corrections As Noted, Resubmit" - This signifies general conformance with the Construction Drawings and Technical Specifications, but more significant changes are required and must be verified and reviewed by the Certifying Engineer.
- "Rejected, Resubmit" - This signifies non-conformance with the Construction Drawings and Technical Specifications and requires resubmittal with conforming materials and methods.
- "Comments Attached" - This may be added to any of the above reviews to request additional information or provide clarification.

The Construction NTR then signs the submittal and returns it to the QC Manager for distribution to the SQCR and the Certifying Engineer. A flowchart of the submittal review process is shown on Figure 2-3.

**FIGURE 2-2  
RFI/FCR FLOW DIAGRAM  
LANDFILL SITES 4 AND 5  
NAVAL WEAPONS STATION EARLE  
COLTS NECK, NEW JERSEY**



**FIGURE 2-3  
SUBMITTAL REVIEW PROCEDURE FLOW DIAGRAM  
SITES 4 AND 5 REMEDIAL ACTION  
NAVAL WEAPONS STATION EARLE  
COLTS NECK, NEW JERSEY**



### **3.0 SQCR TESTING AND INSPECTION ACTIVITIES**

The purpose of this section is to outline the pre-construction and conformance qualification testing and inspection requirements for each material for the remedial action. As appropriate, the key property, inspection method, test method reference, frequency of testing, specification, and response to a failed test or inspection is provided. The materials referenced herein are those described in the Construction Drawings and Technical Specifications of the November 1997 Final (100%) Design Document prepared by Brown & Root Environmental (B&R) for Landfill Sites 4 and 5 at Naval Weapons Station Earle.

Table 3-1 outlines the pre-construction SCQR testing to be performed by the RAC or manufacturer prior to acceptance, placement, or delivery. Table 3-2 outlines the construction conformance testing/inspection to be performed during placement and installation of the components of the remedial action.

It should be noted that, notwithstanding the information presented on these tables, the documents of reference for this project remain the Construction Drawings and Technical Specifications.

#### **3.1 Components/Elements**

The major construction tasks, elements, or components of the landfill cover systems that will be tested and/or inspected are listed below. See Tables 3-1 and 3-2 for specific requirements.

##### **3.1.1 Landfill Subgrade Preparation/Excavation**

Components of landfill subgrade preparation and landfill excavation consist of:

- Excavation of material within the limit of the existing landfill material to achieve the subgrade for the final cover system.
- Placement and compaction of fill materials within the limit of the existing landfill material to achieve the subgrade for the final cover system.

##### **3.1.2 Bedding/Gas Management Layer**

Components of the bedding/gas management layer placement consist of:

- Placement and compaction of gas management layer material for the final cover system.

##### **3.1.3 Drainage Layer Material**

Components of the drainage layer placement consist of:

- Placement and compaction of drainage layer material for the final cover system.

##### **3.1.4 Geomembranes**

Components of the geomembrane consist of:

- Installation of textured VFPE for the 4:1 sideslope cover system.
- Installation of smooth VFPE for the plateau area cover system.

### 3.1.5 Geotextiles

Components of the geotextile placement consist of:

- Placement of non-woven geotextile for the cover system between Drainage Material and Select Fill.
- Placement of non-woven geotextile beneath riprap.
- Placement of Roadway Stabilization Fabric for Cover system between Select Fill and Aggregate Courses.
- Placement of the non-woven Cushion Material between Geomembrane and Drainage Material.

### 3.1.6 Gas Management Piping

Components of the gas management piping construction include:

- Placement of the gas management piping system for the final cover system.

### 3.1.7 Aggregate Base Course Material

Components of the aggregate base course layer placement consist of:

- Placement and compaction of aggregate base course material for the final cover system.

### 3.1.8 Aggregate Surface Course

Components of the aggregate surface course layer placement consist of:

- Placement and compaction of surface course material for the final cover system.

### 3.1.9 Storm Drainage System

Components of the storm drainage system construction consist of:

- Placement of corrugated plastic pipe, fittings, and appurtenances for construction of the storm drainage system.
- Placement of the rip rap layer material for the sideslope cover system.
- Placement of the rip rap layer material for Drainage Channels.
- Placement of the topsoil for fortified Drainage Channels.
- Creation of Sediment/Detention Basins and Emergency Spillways.

### 3.1.10 Monitoring Wells

Components of the monitoring well construction consist of:

- Abandon existing well.
- Extend existing wells.

### 3.1.11 Turf

Components of the turfing of the final cover system consist of:

- Preparing subgrade and placing topsoil
- Hydroseeding finished surface.

### 3.1.12 Wetlands Mitigation

Components of the Wetlands Mitigation consist of:

- Relocating topsoil as part of Wetlands Restoration.
- Planting of trees and shrubs.

### 3.1.13 Relocation of Skeet Range Facilities

Components of Skeet Range relocation consist of:

- Removal and reestablishment of trap and sporting clay houses.
- Construction of cast in place concrete pads and paths.
- Construction of Waste Water Holding Tank and sanitary sewerage system.
- Placement and compaction of asphalt and aggregate surface course parking area.
- Provision of electrical power to skeet range facilities.
- Provision of new exterior light fixtures.

## 3.2 **Three Phases of Control**

The QC Manager and SQCR will perform the three phases of control to ensure that work complies with contract requirements. The Three Phases of Control will adequately cover the following for each definable feature of work. A definable feature of work is a task which is separate and distinct from other tasks and requires separate control requirements.

### 3.2.1 Preparatory Phase

The preparatory phase will be conducted with the QC Manager and/or SQCR, the superintendent, and the foreman responsible for the definable feature, documenting the results of the preparatory phase actions in the daily CQC Report. The following will be performed prior to beginning work on each definable feature of work:

- Review each paragraph of the applicable specification sections;
- Review the Contract Drawings;
- Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;
- Review the testing plan and ensure that provisions have been made to provide the required QC testing;

- Examine the work area to ensure that the required preliminary work has been completed;
- Examine the required materials, equipment, and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data;
- Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDSs) are submitted; and
- Discuss construction methods.

### 3.2.2 Initial Phase

When construction crews are ready to start work on a definable feature of work, the initial phase will be conducted with the QC Manager and/or SQCR, the superintendent, and the foreman responsible for that definable feature of work. Observe the initial segment of the definable feature of work to ensure that the work complies with contract requirements. Document the results of the initial phase in the daily CQC Report. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each definable feature of work:

- Establish the quality of workmanship required;
- Resolve conflicts;
- Review the Safety Plan and the appropriate activity hazard analysis to ensure that applicable safety requirements are met; and
- Ensure that testing is performed by the approved laboratory.

### 3.2.3 Follow-Up Phase

The following will be performed for ongoing work daily, or more frequently as necessary, until the completion of each definable feature of work and document in the daily CQC Report:

- Ensure the work is in compliance with contract requirements;
- Maintain the quality of workmanship required;
- Ensure that testing is performed by the approved laboratory; and
- Ensure that rework items are being corrected.

TABLE 3-1

**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Smooth and Textured VFPE (02142)</b>							
	Interface Friction Angles	Direct Shear Test	ASTM 5321	3 interfaces/source	Smooth VFPE/Cushion Fabric >8 deg; Textured VFPE/Cushion Fabric >25 deg; Drainage Layer/Cushion Fabric >25 deg	See Note 1	Reject Material
	Record Sample	NA	NA	1 per product	36" x 12" sample	See Note 1	NA
	Manufacturer's Qualifications	Review of Certification	NA	1 per manufacturer	Listed on the NSF as having met NSF Standard 54 for Flexible Membrane Liners, at least 5 years continuous experience in the manufacture of geomembrane rolls, or experience totaling at least 10 million sf of VFPE or HDPE geomembrane.	See Note 2	Reject Manufacturer
	Installer's Qualifications	Review of Certification	NA	1 per installer	Placed at least 2 million sf; personnel at least 1 million sf.	See Note 2	Reject Installer
	Resin	Review of Certification	NA	1 per product	Contains between 2 and 3 percent carbon black by weight, a specific gravity between 0.910 and 0.930, and a melt index less than 1.0 gram/10 minutes.	See Note 2	Reject Material
	Quality Control Certificates	Review of Certification	Specified Properties - Refer to Tech. Spec.	1 per product	Signed by the Manufacturer, include roll numbers, identification, and, at a minimum, the results of the following QC tests: thickness, tensile force per unit width and elongation at break, and tear resistance.	See Note 3	Reject Material
	Manufacturer's Warranty	Review of Certification	NA	1 per batch	Geomembrane will not develop cracks or holes from normal service for ten (10) years from delivery date, and the geomembrane is immune from chemical attack and degradation by chemicals specified in the Manufacturer's literature.	See Note 2	Reject Material
	Ozone Substances	Review of Certification	NA	1 per batch	No ozone depleting substances were used in the manufacture of the geomembrane.	See Note 2	Reject Material
	Extrusion Resin	Review of Certification	NA	1 per batch	Same material as sheet resin	See Note 2	Reject Material
	Textured Manufacture Method	Visual/Review of Certification	NA	1	Textured on both sides by coating at time of manufacture rather than etched construction; Uniform textured surface.	See Note 2	Reject Material
	Average Thickness	Review of Certification	ASTM D5199	1 per batch	≥40 mil	See Note 3	Reject Material



TABLE 3-1

**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Smooth and Textured VFPE (cont'd)</b>							
	Thickness	Review of Certification	ASTM D5199	1 per batch	≥36 mil	See Note 3	Reject Material
	Specific Gravity	Review of Certification	ASTM D1505	1 per batch	0.910 to 0.935	See Note 3	Reject Material
	Carbon Black Dispersion	Review of Certification	ASTM D1603	1 per batch	A1, A2, or B1	See Note 3	Reject Material
	Melt Index	Review of Certification	ASTM D1238	1 per batch	<1.0 gm/10 min.	See Note 3	Reject Material
	Tensile Strength	Review of Certification	ASTM D638	1 per batch	≥150 ppi (smooth); ≥75 ppi (textured)	See Note 3	Reject Material
	Elongation	Review of Certification	ASTM D638	1 per batch	≥500% (smooth); ≥200% (textured)	See Note 3	Reject Material
	Low Temperature Brittleness	Review of Certification	ASTM D746	1 per batch	≤-90°F	See Note 3	Reject Material
	Tear Resistance	Review of Certification	ASTM D1004	1 per batch	≥20 lbs.	See Note 3	Reject Material
	Puncture Resistance	Review of Certification	FTM-STD 101 Method 2065	1 per batch	≥45 lbs.	See Note 3	Reject Material
	Dimensional Stability	Review of Certification	ASTM D1204 (1 hr. at 212°F)	1 per batch	≤3% at 1 hour at 212°F	See Note 3	Reject Material
<b>Gas Management Piping (02143)</b>							
PVC Plastic Pipe and Fittings	Type and Size of Pipe	Review of Literature	NA	1 per product	ASTM D1785, PVC 1120, Schedule 80	See Note 2	Reject Materials
	Type and Size of Fittings	Review of Literature	NA	1 per product	Solvent Welded Socket ASTM D2467, Schedule 80, or Threaded ASTM D2464	See Note 2	Reject Materials
	Solvent Cement	Review of Literature	NA	1 per product	ASTM D2564	See Note 2	Reject Materials

TABLE 3-1

SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
 LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
 NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Geotextiles (02272)</b>							
General	Manufacturer Method	Review of Certification	NA	1 per product	Continuous inspection for needles with permanent on-line full-width metal detectors.	See Note 2	Reject Material
	Material	Review of Literature	NA	1 per product	≥85% polyolefins, polyesters, or polyamides. Filaments retain dimensional stability relative to each other.	See Note 2	Reject Material
Non-Woven Cushion Material	Record Sample	NA	NA	1 per batch or 100,000 sf	36" x 12" sample	See Note 3	NA
	Weight	Review of Literature	ASTM D3776	1 per product	≥12 oz/sy	See Note 3	Reject Material
	Puncture Resistance	Review of Literature	ASTM D4833	1 per product	≥150 lbs.	See Note 3	Reject Material
	Grab Tensile Strength	Review of Literature	ASTM D4632	1 per product	≥275 lbs.	See Note 3	Reject Material
	Trapezoidal Tear Strength	Review of Literature	ASTM D4533	1 per product	≥110 lbs.	See Note 3	Reject Material
	Burst Strength	Review of Literature	ASTM D3786	1 per product	≥590 psi	See Note 3	Reject Material
Roadway Stabilization Fabric	Record Sample	NA	NA	1 per product	36" x 12" sample	See Note 2	NA
	Grab Tensile Strength	Review of Literature	ASTM D4632	1 per product	≥200 lbs.	See Note 3	Reject Material
	Puncture Resistance	Review of Literature	ASTM D4833	1 per product	≥80 lbs.	See Note 3	Reject Material
	Burst Strength	Review of Literature	ASTM D3786	1 per product	≥320 psi	See Note 3	Reject Material
	Trapezoidal Tear Strength	Review of Literature	ASTM D4533	1 per product	≥50 lbs.	See Note 3	Reject Material
	Seam Strength	Review of Literature	ASTM D4632	1 per product	≥180 lbs.	See Note 3	Reject Material
	UV Degradation	Review of Literature	ASTM D4355	1 per product	70% at 150 hrs.	See Note 3	Reject Material

**TABLE 3-1**  
**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Geotextiles (cont'd)</b>							
Roadway Stabilization Fabric (cont'd)	AOS	Review of Literature	ASTM D4715	1 per product	≤0.6 mm	See Note 3	Reject Material
	Permeability	Review of Literature	ASTM D4491	1 per product	≥1 x 10 <sup>-9</sup> cm/sec	See Note 3	Reject Material
Non-Woven Geotextile	Permittivity	Review of Literature	ASTM D4491	1 per product	≥0.05 sec	See Note 3	Reject Material
	AOS	Review of Literature	ASTM D4751	1 per product	≤0.43 mm	See Note 3	Reject Material
<b>Landfill Preparation/Excavation (02315)</b>							
Common/ Select/ Restricted Fill	Moisture Density	Standard Proctor	ASTM D698	1 per off-site borrow source; 1 per 200 feet along baseline on-site	None	See Note 1	NA
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per off-site borrow source; 1 per 200 feet along baseline on-site	Classify GC, SW, SP, SM, SC, ML, CL	See Note 1	Reject Material
	Liquid Limit, Plastic Limit, Plasticity Index	Atterberg Limits Test	ASTM D4318	1 per off-site borrow source; 1 per 200 feet along baseline on-site	LL <50	See Note 1	Reject Material
	Gradation	Sieve Analysis	ASTM C136	1 per off-site borrow source; 1 per 200 feet along baseline on-site	Classify SW, SP, SM, SC, ML, CL	See Note 1	Reject Material
	Acid Production	Iron Sulfide Test	Rutgers Soil Testing Lab "Soil Test #6"	3 per borrow source (off- site) if suspected	Zero Iron Sulfide	See Note 1	Reject Material
<b>Bedding/Gas Management Layer (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per off-site borrow source	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per off-site borrow source	Classify SP	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per off-site borrow source	<10%	See Note 1	Reject Material

TABLE 3-1

**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Granular Drainage Material (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per off-site borrow source	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per off-site borrow source	$D_{85} > 4D_{15}$	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per off-site borrow source	$D_2 > 0.1$ inch	See Note 1	Reject Material
<b>Aggregate Base Course (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per off-site borrow source	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per off-site borrow source	SHS NJDOT, Section 901 Table 901-2, Type I-2	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per off-site borrow source	0-7%	See Note 1	Reject Material
<b>Aggregate Surface Course (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per off-site borrow source	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per off-site borrow source	SHS NJDOT, Section 901-08	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per off-site borrow source	3-12%	See Note 1	Reject Material
<b>Riprap (02315)</b>							
	Gradation	Gradation Test	ASTM C136	1 per borrow source	Type I $D_{50} = 4$ inch Type II $D_{50} = 6$ inch	See Note 1	Reject Material
<b>Casing Pipe (02315)</b>							
	Type and Size of Pipe	Review of Literature	NA	1 per product	ASTM A139, Grade B, or ASTM A252, Grade 2	See Note 2	Reject Material

TABLE 3-1

**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Monitoring Wells (02524)</b>							
	Type and Size of Outer Casing	Review of Certification	NA	1 per product	ASTM A53, Grade A	See Note 2	Reject Material
	Type and Size of Well Casing	Review of Certification	NA	1 per product	ASTM D1785 and NSF STD 14, Schedule 40 PVC Pipe	See Note 2	Reject Material
	Cement Grout	Review of Certification	NA	1 per product	ASTM C150, Type I or II	See Note 2	Reject Material
<b>Sanitary Sewerage (02530)</b>							
	Type and Size of Pipe	Review of Literature	NA	1 per product	ASTM D3034, SDR 35, or ASTM F949	See Note 2	Reject Material
	Type of Joints and Gaskets	Review of Literature	NA	1 per product	ASTM D3212 (joints), ASTM F477 (gaskets)	See Note 2	Reject Materials
	Design Calculations for Holding Tank	Review of Design Criteria and P.E. Stamp	NA	1 per product	NJAC Title 7, Chapter 7:14A-23.5	See Note 2	Reject Design
	Type and Size of Frames and Covers	Review of Literature	NA	1 per product	FS RR-F-621 Figure 4, Size 22 (frame), Figure 12, Size 22 (cover)	See Note 2	Reject Material
<b>Electrical Manhole and Handhole (02582)</b>							
	Type of Manhole or Handhole	Review of Literature	NA	1 per product	ACI 318 and AASHTO HB14	See Note 2	Reject Material
	Type of Frame and Cover	Review of Literature	NA	1 per product	FS.RR-F-621	See Note 2	Reject Material
<b>Storm Drainage (02631)</b>							
	Type and Size of Piping	Review of Literature	NA	1 per product	Corrugated HDPE conforming to AASHTO M252 or AASHTO M294, Type S	See Note 2	Reject Material
<b>Bituminous Concrete Pavement (02741)</b>							
	Mix Design	Review of Mix Design Report	NA	1 per mix	SHS NJDOT Section 903, Paragraph 903.05, Type I-5	See Note 2	Reject Mix
	Producer Certificate	Review of Certificate	NA	1 per producer	Conformance with Tech. Spec.	See Note 2	Reject Material
	Laboratory Results	Review Results	NA	1 per mix	Less than 1 year old	See Note 2	Reject Material

TABLE 3-1

**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Turf (02921)</b>							
	Physical Characteristics of Fertilizer	Review of Literature	NA	1 per product	Rutgers University Soil Test Recommendations	See Note 2	Reject Material
	Type of Seed	Review of Certification	NA	1 per product	DOA FSA	See Note 2	Reject Material
	Topsoil Composition	Soil Test	DOA SSIR	1 per borrow source	NJDA SE & SC, Section 3.5.1	See Note 1	Modify Accordingly with Adjusters, Conditioners, and Fertilizers
	Acid Production	Iron Sulfide Test	Rutgers University "Soil Test #6"	1 per borrow source	Zero Iron Sulfide	See Note 1	Reject Material
<b>Wetlands, Shrubs, Plants, and Grass (02951)</b>							
	Plant Types, Quality, and Size	Review of Certifications	NA	1 per plant type	DOI List of Botanical Names, ANSI 260.1 and nursery grown within 500 miles of Colts Neck in USDOA Hardiness Zone 7	See Note 2	Reject Materials
<b>Cast-In-Place Concrete (03300)</b>							
	Mix Design	Review Mix Design	NA	1 per concrete strength and type	ASTM C94, Option A; 3,000 psi 28 day strength; Aggregate: ASTM C260, No. 67	See Note 2	Reject Mix
	Curing Compound	Review of Literature	NA	1 per product	ASTM C309, white-pigmented, Type 2	See Note 2	Reject Material
	Grout	Review of Literature	NA	1 per product	ASTM C1107	See Note 2	Reject Material
<b>Overhead Transmission and Distribution (16301)</b>							
	Tested Transformer Losses	Review of Certification	NA	1 per product	NEMA Class 1 efficiency at full and one-half load	See Note 3	Reject Transformer
	Transformer Size and Type	Review of Literature	NA	1 per product	ANSI C57.12.20	See Note 2	Reject Transformer
	Overhead-type Distribution Transformer Routine	Review of Test Reports	NA	1 per product	ANSI/IEEE C57.12.00 ANSI/IEEE C57.12.90	See Note 3	Reject Transformer

TABLE 3-1

**SUMMARY OF PRE-CONSTRUCTION SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Service and Distribution (16400)</b>							
	Panelboard	Review of Literature and Drawing	NA	1 per product	UL 67, UL 50	See Note 2	Reject Material
	Disconnect Switches	Review of Literature	NA	1 per product	NEMA ICS 1	See Note 2	Reject Materials
<b>Underground Electrical Work - Low Voltage (16403)</b>							
	Wires and Cables	Review of Literature	NA	1 per product	UL 83 THWN (conductors), "W" type, $\geq$ No. 12 AWG (wires), Manufactured within last 12 months.	See Note 2	Reject Materials
	Conduit	Review of Literature	NA	1 per product	UL 6 (rigid galvanized), NEMA RN 1 (PVC coated), UL 1242 (intermediate galvanized)  NEMA TC 2, Type EPC-40-PVC (plastic)  NEMA TC 8, ASTM F512, Type EB-35 (plastic ducts)	See Note 2	Reject Materials
	Conduit Fittings	Review of Literature	NA	1 per product	UL 514A and UL 514B (metal)  NEMA TC 3 (PVC)	See Note 2	Reject Materials
	Ground Rods	Review of Literature	NA	1 per product	$\geq 3/4"$ diameter, 10' long (rod), $\geq$ No. 4 AWG (wire)	See Note 2	Reject Materials
<b>Exterior Lighting (16524)</b>							
	Lighting Fixtures	Review of Literature	NA	1 per product	ANSI C136.14 or UL 1572	See Note 2	Reject Materials
	Contactors	Review of Literature	NA	1 per product	NEMA ICS 2	See Note 2	Reject Material
	Photocell Switch	Review of Literature	NA	1 per product	UL 773 or UL 773A	See Note 2	Reject Material

Note 1: SQCR to perform test, provide results to QC Manager prior to delivery of material.

Note 2: SQCR to prepare or provide document, provide to QC Manager prior to delivery of material.

Note 3: Manufacturer to perform test, provide results to SQCR, who provides results to QC Manager prior to delivery of material.

**TABLE 3-2**  
**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Smooth and Textured VFPE (02142)</b>							
	Record Sample	NA	NA	1 per 100,000 sf	36" x 12" sample	See Note 2	NA
	Subbase Acceptability	Review of Certification	NA	1 per area	Written statement from RAC that subgrade is acceptable for geomembrane placement.	See Note 2	Rework Subbase
	Quality Control Certificates	Review of Certification	Specified Properties - Refer to Tech. Spec.	1 per every 2 rolls of geomembrane	Signed by the Manufacturer, include roll numbers, identification, and, at a minimum, the results of the following QC tests: thickness, tensile force per unit width and elongation at break, and tear resistance.	See Note 3	Reject Material
	Test Seams - Shear Strength	Field Tensiometer Test	ASTM D4437	Beginning of each seaming period, every 4 hours thereafter, and 1 per 500 feet of seam, minimum.	8 feet long (wedge), 3 feet long (extrusion), at beginning of each seaming period, every 4 hours thereafter.	See Note 2	Produce Test Seams
	Test Seams - Peel Strength	Field Tensiometer Test	ASTM D4437	Beginning of each seaming period, every 4 hours thereafter, and 1 per 500 feet of seam, minimum.	8 feet long (wedge), 3 feet long (extrusion), at beginning of each seaming period, every 4 hours thereafter.	See Note 2	Produce Test Seams
	Shear Strength	Shear Test	ASTM D413	1 per 500 feet of seam, minimum	30 ppi, minimum	See Note 2	Adjustment or Replacement, Repair Seams
	Peel Strength	Peel Test	ASTM D3083	1 per 500 feet of seam, minimum	30 ppi, minimum Film Tear Bond	See Note 2	Adjustment or Replacement, Repair Seams
	Non-destruct Testing of Seams	Vacuum Box	NA	100%	Air Tight	See Note 1	Repair Seam, Retest
	Roll Labeling	Visual	NA	100%	All rolls with Manufacturer's Name, Batch No., Dimensions, Roll No., Date of Fabrication, Directions for Unrolling and Unfolding.	See Note 1	Obtain Label Information
	Roll Storage	Visual	NA	100%	Wrapped to protect against ultraviolet light and water.	See Note 1	Repair/Replace Wrapping
	Transportation and Handling	Visual	NA	Random	Rolls protected and dry, handling equipment not pose damage, handle with care.	See Note 1	Protect, Cover, and Use Safe Equipment
	Surface of Geomembrane	Visual	NA	100%	Surface free of flaws or damage.	See Note 1	Remove Reject if Severe; Repair if Minor



**TABLE 3-2**  
**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Smooth and Textured VFPE (cont'd)</b>							
	Storage	Visual	NA	100%	Location provides adequate protection from puncture, is free of standing water, maximum 5 rolls in height, rolls or pallets secured.	See Note 1	Correct Storage Area
	Folds or Fishmouths	Visual	NA	100%	None	See Note 1	Repair Geomembrane
	Placement	Visual	NA	100%	Placed only in presence of QC Specialist. 40 hours notice to Contracting Officer required.	See Note 2	Halt Work
	Amount Placed	Visual	NA	100%	Limited to amount that can be anchored, ballasted, and sealed in 1 day; cannot be uncovered for more than 10 days.	See Note 1	Reject Installation
	Equipment	Visual	NA	100%	Any equipment used does not damage the geomembrane by handling, trafficking, or other means. No vehicular traffic shall be operated directly on the geomembrane.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Equipment	Visual	NA	100%	The geomembrane in trafficked areas shall be protected by a minimum of the cushion fabric overlaid by 12" of material meeting the gradation of the drainage layer.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Personnel	Visual	NA	100%	All personnel working on the geomembrane shall not smoke, wear damaging shoes, or engage in other activities which could damage the geomembrane.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Methods	Visual	NA	100%	The method used to unroll the geomembranes shall not cause scratching, folds, or crimps in the geomembrane and shall not rut the supporting soil.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Ballasting	Visual	NA	100%	Adequate ballasting shall be placed to prevent uplift by wind and creep without damaging the geomembrane.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Seam Layout	Visual	NA	100%	Oriented parallel to line of maximum slope, no T-shaped closer than 5 feet to toe of slope.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Seam Overlap	Measurement	NA	100%	4 inches minimum (wedge), 3 inches minimum (extrusion).	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
	Weather	Visual	NA	Daily	Placement only permitted between 40 and 100°F, periods of no precipitation, no excessive moisture (fog or dew), no excessive winds, no frozen soil.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage

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**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Smooth and Textured VFPE (cont'd)</b>							
	Pipe Boots	Visual	NA	100%	Manufacturer's Standard, same base material, 4 inch neoprene and 4 inch stainless.	See Note 1	Correct Nonconformance, Inspect Work, Reject/Repair Damage
<b>Gas Management Piping (02143)</b>							
	Location of Pipes, Vents, Blind Flange	Measurements	Survey	100%	Within 3 feet of contract documents.	See Note 1	Reposition
	Joint Assembly	Visual	NA	Random	ASTM D2855	See Note 1	Reassemble Joint
<b>Geotextiles (02272)</b>							
All Geotextiles	Record Sample	NA	NA	1 per 100,000 sf	36" x 12" sample	See Note 2	NA
	Protective Wrapping	Visual	NA	100%	The Installer shall remove the protective wrappings from the geotextile rolls to be deployed only after the substrate layer, soil, or other geosynthetic has been been documented and approved by the SQCR.	See Note 1	Correct Nonconformance
	Protection of Underlying Layers	Visual	NA	100%	The Installer shall take the necessary precautions to protect the underlying layers upon which the geotextile will be laid. if the substrate is soil, care should be taken to avoid rutting of the soil.	See Note 1	Correct Nonconformance
	Substrate	Visual	NA	100%	If the substrate is comprised of geosynthetic materials, the geotextile will be deployed by hand by use of small jack lifts on pneumatic tires having low ground contact pressure, or by use of all-terrain vehicles (ATVs) having low ground contact pressure (<5.0 psi).	See Note 1	Correct Nonconformance
	Trapped Material	Visual	NA	100%	During placement, care must be taken to avoid trapping stones, excessive dust, or moisture that could damage the geomembrane.	See Note 1	Correct Nonconformance
	Anchoring	Visual	NA	100%	On sideslopes the geotextiles should be anchored at the top and then unrolled so as to the geotextile free of wrinkles and folds.	See Note 1	Correct Nonconformance
	Ballast	Visual	NA	100%	The geotextile should be weighted with sandbags, or the equivalent, to provide resistance against wind uplift.	See Note 1	Correct Nonconformance

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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Geotextiles (cont'd)</b>							
	Harmful Objects	Visual	NA	100%	A visual examination of the geotextile should be carried out to ensure that no potentially harmful objects are present such as stones, sharp objects, small tools, sandbags, etc.	See Note 1	Correct Nonconformance
	Exposure	Visual	NA	100%	Prolonged exposure to sunlight will not be allowed.	See Note 1	Correct Nonconformance
	Exposure	Visual	NA	100%	Deployed geotextile will not be exposed more than 14 days without cover.	See Note 1	Correct Nonconformance
	Weather	Visual	NA	100%	Geotextile should not be exposure to precipitation or temperatures >140°F prior to being installed.	See Note 1	Correct Nonconformance
	Locations	Visual	NA	100%	Geotextile should be placed at the locations indicated.	See Note 1	Correct Nonconformance
	Defects	Visual	NA	100%	All defective geotextile (i.e., holes, rips, flaws, deterioration, or damage) material will be rejected and removed from the site to avoid use.	See Note 1	Correct Nonconformance
	Orientation	Visual	NA	100%	On slopes >5H:1V, the long dimension of the roll will be placed parallel to the slope.	See Note 1	Correct Nonconformance
	Wrinkles	Visual	NA	100%	All material will be laid flat and without incurring tensino, stress, wrinkles, folds, or creases in the material.	See Note 1	Correct Nonconformance
	Seams	Visual	NA	100%	The geotextile panels will be joined by overlapping seams (minimum 12"). On slopes >4H:1V, seams shall be continuously sewn using a "prayer" seam with one row of a two thread chain stitch (minimum 3" from stitch line to edge of geotextile).	See Note 1	Correct Nonconformance
	Overlap	Visual	NA	100%	Overlap joints shall be measured as a single layer of cloth.	See Note 1	Correct Nonconformance
	Repairs	Visual	NA	100%	Patch to extend a minimum of 12" beyond edge of damage and be sewn.	See Note 1	Correct Nonconformance
	Shingle	Visual	NA	100%	The panels shall be placed so that the pugrade gabric overlaps the downgrade fabric.	See Note 1	Correct Nonconformance

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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Landfill Preparation/Excavation (02315)</b>							
Common/ Select/ Restricted Fill	Gradation	Gradation Test	ASTM C136	1 test per 2,000 cy or source change (off-site) 1 test per 200 ft along baseline (on-site)	Classify according to ASTM D2487.	See Note 1	Use as Common/ Select/Restricted, as Appropriate
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 test per 2,000 cy or source change (off-site) 1 test per 200 ft along baseline (on-site)	Classify according to ASTM D2487.	See Note 1	Use as Common/ Select/Restricted, as Appropriate
	Liquid Limit, Plastic Limit, Plasticity Index	Atterberg Limits Test	ASTM D4318	1 test per 2,000 cy or source change (off-site) 1 test per 200 ft along baseline (on-site)	Classify according to ASTM D2487 and LL ≤50.	See Note 1	Use as Common/ Select/Restricted, as Appropriate
	Moisture/Density	Standard Proctor Test	ASTM D698	1 test per 2,000 cy or source change (off-site) 1 test per 200 ft along baseline (on-site)	None	See Note 1	NA
	Field Density/Moisture	Nuclear Densometer	ASTM D2922/3017	1 per 10,000 sf per lift	90% of ASTM D698 (general site) 95% of ASTM D698 (under slabs and paved areas)	See Note 1	Recompact
	Density Verification	Sand Cone	ASTM D1556	1 per 10 ASTM D2922/3017	±5%	See Note 1	Change or Recalibrate Densometer
	Proof Rolling	Visual	NA	100% on waste material	6 passes with 15 ton roller between 2½ to 3½ mph	See Note 1	Complete Proof Rolling
	Grades and Elevation	Survey	NA	50 ft offsets, 50 ft intervals along baseline	Within 0.5 feet	See As Built	Regrade Area
	Lift Thickness	Visual and Measure- ment at Density Tests Locations	NA	Random	12" maximum	See Note 1	Remove and Recompact
	Material Separation	Visual	NA	100%	Separate Landfill Material as: a. Any dimension >3 feet b. Any dimension between 6" and 3 feet c. All dimensions <6" d. Ordnance Materials e. Intact Drums	See Note 2	a. Dispose of as directed under Landfill Cap; b. Use as Com- mon Fill in 12" lifts; c. Use as Common Fill; d. Contact EOD and ROICC; e. Over-pack and Stockpile
<b>Bedding/Gas Management Layer (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 5,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 2,000 cy or borrow source change	Classify SP	See Note 1	Reject Material

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**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Bedding/Gas Management Layer (cont'd)</b>							
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 2,000 cy or borrow source change	<10%	See Note 1	Reject Material
	Field Density	Nuclear Densometer	ASTM D2922/3017	1 per 10,000 sf per lift	60% of Relative Density	See Note 1	Recompact
	Density Verification	Sand Cone	ASTM D1556	1 per 10 ASTM D2922	±5%	See Note 1	Change or Recalibrate Densometer
	Lift Thickness	Visual and Measure- ment at Density Test Locations	NA	Random	12" ± 1"	See Note 1	Rework Layer
<b>Granular Drainage Material (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 2,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 2,000 cy or borrow source change	D <sub>85</sub> > 4D <sub>15</sub>	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 2,000 cy or borrow source change	D <sub>2</sub> > 0.1 inch	See Note 1	Reject Material
	Field Density	Nuclear Densometer	ASTM D2922/3017	1 per 10,000 sf per lift	70% of Relative Density	See Note 1	Recompact
	Density Verification	Sand Cone	ASTM D1556	1 per 10 ASTM D2922	±5%	See Note 1	Change or Recalibrate Densometer
	Lift Thickness	Visual and Measure- ment at Density Test Locations	NA	Random	12" ± 1"	See Note 1	Rework Layer
<b>Aggregate Base Course (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 2,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 2,000 cy or borrow source change	SHS NJDOT, Section 901 Table 901-2, Type I-2	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 2,000 cy or borrow source change	0-7%	See Note 1	Reject Material
	Field Density	Nuclear Densometer	ASTM D2922/3017	1 per 10,000 sf per lift	70% or Relative Density	See Note 1	Recompact

TABLE 3-2

**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Aggregate Base Course (cont'd)</b>							
	Density Verification	Sand Cone	ASTM D1556	1 per 10 ASTM D2922	±5%	See Note 1	Change or Recalibrate Densometer
	Lift Thickness	Visual and Measure- ment at Density Test Locations	NA	Random	10" ± 1"	See Note 1	Rework Layer
<b>Aggregate Surface Course (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per off-site borrow source	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per off-site borrow source	SHS NJDOT, Section 901-08	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per off-site borrow source	3-12%	See Note 1	Reject Material
	Field Density	Nuclear Densometer	ASTM D2922/3017	1 per 10,000 sf per lift	70% or Relative Density	See Note 1	Recompact
	Density Verification	Sand Cone	ASTM D1556	1 per 10 ASTM D2922	±5%	See Note 1	Change or Recalibrate Densometer
	Lift Thickness	Visual and Measure- ment at Density Test Locations	NA	Random	6" ± 1"	See Note 1	Rework Layer
	Grades and Elevation	Survey	NA	50 ft offsets 50 ft intervals along baseline	Within 0.5 feet	See As Built	Regrade Areas
<b>Riprap (02315)</b>							
	Gradation	Gradation Test	ASTM C136	1 per 2,000 cy or borrow source change	Type I D <sub>50</sub> = 4 inch Type II D <sub>50</sub> = 6 inch	See Note 1	Reject Material
	Grades and Elevation	Survey	NA	50 ft intervals	Within 0.5 feet	See As Built	Regrade
<b>Pipe Bedding (02315)</b>							
	Compaction	Nuclear Densometer	ASTM D2922	1 per 200 linear ft per lift	95% of ASTM D698	See Note 1	Recompact

**TABLE 3-2**  
**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Monitoring Wells (02524)</b>							
	Well Abandonment	Visual	EPA 650/4-89/034	100%	Grout borehole annulus, allow to settle, add additional grout.	NJAC Title 7, Chapter 7:26E	RegROUT
	Well Extension	Visual	NA	100%	Match Existing Casing and Riser	See Note 1	Correct Weld and/or Collar
	Location/Elevation	Survey	NA	100%	Elevations on Drawings	See As Builts	Correct Elevation
<b>Sanitary Sewerage (02530)</b>							
	Joint Assembly	Visual	NA	100%	ASTM D2321	See Note 1	Reassemble Joint/Gasket
	Grade and Elevation	Survey	NA	100%	Lines and Grades on Drawings	See As Builts	Relay Pipe
<b>Electrical Manhole and Handhole (02582)</b>							
	Installation	Visual	NA	100%	NFPA 70 and ANSI C2	See Note 1	Correct Position and Assembly
<b>Storm Drainage (02631)</b>							
	Grade and Elevation	Survey	NA	100%	Lines and Grades on Drawings	See As Builts	Relay Pipe
<b>Bituminous Concrete Pavement (02741)</b>							
	Mix	Extraction Test	ASTM D2172	2 per day per mix type at plant or from truck	SHS NJDOT Section 903, para 05 Type I-5	See Note 2	Reject Materials, Cease Operations, New Trial Batch
	Gradation	Sieve Analysis	AASHTO T30	2 per day per mix type at plant or from truck	SHS NJDOT Section 903, para 05 Type I-5	See Note 2	Reject Materials, Cease Operations, New Trial Batch
	Stability and Flow	Stability and Flow Test	ASTM D1559	2 per day per mix type at plant or from truck	SHS NJDOT Section 903, para 05 Type I-5	See Note 2	Reject Materials, Cease Operations, New Trial Batch
	Pavement Density	Nuclear Densometer	ASTM D2950	1 per 10,000 sf	SHS NJDOT Section 404, paras 01-16	See Note 2	Recompact
	Pavement Thickness	Formula	Tech. Spec.	1 per 10,000 sf	2 inches	See Note 2	Rework Layer
	Grade and Elevation	Survey	NA	50 ft offsets 50 ft intervals along baseline	Within 0.5 feet of grades on Drawings	See As Builts	Regrade

TABLE 3-2

**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION  
LANDFILL SITES 4 AND 5 REMEDIAL ACTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Turf (02921)</b>							
	Subgrade Preparation	Visual	NA	100%	Track with Dozer	See Note 1	Rework Surface
	Fertilizers, pH Adjusters, Soil Conditions	Review of Application Rates	NA	100%	NJDA SE&SC, Section 3.5.1	See Note 2	Modify Rate of Application
	Grade and Elevation	Survey	NA	50 ft offsets 50 ft intervals along baseline	Design contours on Drawings within 0.5 ft	See As Builts	Regrade Layer
	Seeding	Review of Mix	NA	100%	Proportions listed on Drawing C-2	See Note 2	Reject Materials
<b>Wetlands, Shrubs, Plants, and Grass (02951)</b>							
	Wetlands Restoration	Visual	NA	100%	Plants, Seed, and Fertilizer listed on Drawing C-9	See Note 2	Reject Planting
<b>Cast-in-Place Concrete (03300)</b>							
	Slump	Measurement	ASTM C143	Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch or every 10 cy of concrete.	2-4 inches	See Note 1	Reject Material
	Temperature	Measurement	NA	Perform tests in hot or cold weather conditions for each batch or every 10 cy of concrete and whenever test cylinders and slump tests are made.	Below 50°F and above 80°F	See Note 1	NA
	Compressive Strength	Measurement	ASTM C39/C31/C42	Samples shall be taken not less than once a day, nor less than once for each 100 cy of concrete, nor less than one for each 5,000 sf of surface area.	3,000 psi	See Note 1	Remove and Replace with New Material
	Air Content	Measurement	ASTM C173/C231	Same frequency as specified for slump tests.	4-6%	See Note 1	Reject Material



TABLE 3-2

**SUMMARY OF CONSTRUCTION CONFORMANCE SQCR TESTING/INSPECTION  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Overhead Transmission and Distribution (16301)</b>							
	Transformer	Visual, Mechanical, and Electrical	NA	100%	NFPA 70B, NETA ATS	See Note 2	Reject Transformer
	Grounding System	Visual, Mechanical, and Electrical	NA	100%	ANSI C2	See Note 2	Reject System
<b>Service and Distribution (16400)</b>							
	Panelboard, Switches	Visual, Mechanical, and Electrical	NA	100%	NFPA 70, ANSI C2	See Note 2	Reject System
	System Layout	Review of Diagram	NA	100%	Single Line Diagram	See As Built	Reject System
<b>Underground Electrical Work - Low Voltage (16403)</b>							
	Installation	Cable Test	NA	100%	Apply 500 volts to provide 250,000 ohms minimum resistance.	See Note 2	Reject Installation
<b>Exterior Lighting (16524)</b>							
	Installation	Operational Test	NA	100%	ANSI C2, NFPA 70	See Note 2	Reject Installation

Note 1: SQCR to perform test/inspection.

Note 2: SQCR to perform test/inspection, provide results to QC Manager prior to delivery of material.

Note 3: Manufacturer to perform test, provide results to SQCR, who provides results to QC Manager prior to delivery of material.

#### **4.0 QC MANAGER TESTING/INSPECTION ACTIVITIES**

To assure accuracy and consistency of test results generated by the testing activities of the SQCR, the QC Manager will duplicate tests as described in Table 4-1 and utilize separate laboratory facilities.

The purpose of this section is to outline the testing/inspections to be performed by the QC Manager. As appropriate, the key property, inspection method, test method reference, frequency of testing, specification, and response to a failed test or inspection is provided. The materials referenced herein are those described in the Construction Drawings and Technical Specifications of the November 1997 Final (100%) Design Document prepared by B&R Environmental for the Landfill Sites 4 and 5 at Naval Weapons Station Earle.

See Table 4-1 for a summary of the QC Manager testing/inspection activities.

**TABLE 4-1**  
**SUMMARY OF QC MANAGER INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Smooth and Textured VFPE (02142)</b>							
	Record Sample	NA	NA	1 per 100,000 sf	36" x 12" sample	See Note 1	NA
	Quality Control Certificates	Review of Certification	Specified Properties - Refer to Tech Spec.	1 per every 2 rolls of geomembrane	Signed by the Manufacturer, include roll numbers, identification, and, at a minimum, the results of the following QC tests: thickness, tensile force per unit width and elongation at break, and tear resistance.	See Note 1	Reject Material
	Shear Strength	Shear Test	ASTM D413	1 per 5,000 ft of seam, minimum	30 ppi, minimum	See Note 1	Welding Device Adjustment or Replacement, Repair Seams
	Peel Strength	Peel Test	ASTM D3083	1 per 5,000 ft of seam, minimum	30 ppi, minimum	See Note 1	Welding Device Adjustment or Replacement, Repair Seams
	Average Thickness	Thickness Test	ASTM D751 (Modified)	1 per 20 rolls	≥40 mil	See Note 1	
	Thickness	Thickness Test	ASTM D751 (Modified)	1 per 20 rolls	≥36 mil	See Note 1	
	Specific Gravity	Specific Gravity Test	ASTM D1505	1 per 20 rolls	0.910 to 0.930	See Note 1	
<b>Geotextiles (02272)</b>							
All Geotextiles	Record Sample	NA	NA	1 per 100,000 sf	36" x 12" sample	See Note 1	NA
Non-Woven Cushion Material	Weight	Review of Certification	ASTM D3776	1 per 200,00 sf	≥12 oz/sy	See Note 1	Reject Material
Non-Woven Geotextile	Permittivity	Review of Certification	ASTM D4491	1 per 200,000 sf	≥0.05 seconds	See Note 1	Reject Material
Roadway Stabilization Fabric	Tensile Strength	Review of Certification	ASTM D4632	1 per 200,000 sf	≥200 lbs.	See Note 1	Reject Material

**TABLE 4-1**  
**SUMMARY OF QC MANAGER INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Landfill Preparation/Excavation (02315)</b>							
Common/ Select/ Restricted Fill	Gradation	Gradation Test	ASTM C136	1 test per 10,000 cy or source change (off-site)	Classify according to ASTM D2487.	See Note 1	Use as Common/ Select/Restricted, as Appropriate
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 test per 10,000 cy or source change (off-site)	Classify according to ASTM D2487.	See Note 1	Use as Common/ Select/Restricted, as Appropriate
	Liquid Limit, Plastic Limit, Plasticity Index	Atterberg Limits Test	ASTM D4318	1 test per 10,000 cy or source change (off-site)	Classify according to ASTM D2487 and LL ≤50.	See Note 1	Use as Common/ Select/Restricted, as Appropriate
	Moisture/Density	Standard Proctor Test	ASTM D698	1 test per 10,000 cy or source change (off-site)	None	See Note 1	NA
	Lift Thickness	Visual	NA	Random	12" maximum	See Note 1	Remove and Recompact
<b>Bedding/Gas Management Layer (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 10,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 10,000 cy or borrow source change	Classify SP	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 10,000 cy or borrow source change	<10%	See Note 1	Reject Material
	Lift Thickness	Visual	NA	Random	12" ± 1"	See Note 1	Rework Layer
<b>Granular Drainage Material (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 10,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 10,000 cy or borrow source change	$D_{85} > 4D_{15}$	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 10,000 cy or borrow source change	$D_2 > 0.1$ inch	See Note 1	Reject Material
	Lift Thickness	Visual	NA	Random	12" ± 1"	See Note 1	Rework Layer

**TABLE 4-1**  
**SUMMARY OF QC MANAGER INSPECTION**  
**LANDFILL SITES 4 AND 5 REMEDIAL ACTION**  
**NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY**  
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Component/ Element	Key Property	Inspection Method	Test Method Reference	Frequency of Testing	Specification	Procedure for Submittal	Response to Failed Inspection/Test
<b>Aggregate Base Course (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 10,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 10,000 cy or borrow source change	SHS NJDOT, Section 901 Table 901-2, Type I-2	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 10,000 cy or borrow source change	0-7%	See Note 1	Reject Material
	Lift Thickness	Visual	NA	Random	10" ± 1"	See Note 1	Rework Layer
<b>Aggregate Surface Course (02315)</b>							
	Maximum/Minimum Density	Relative Density Test	ASTM D4253/4254	1 per 10,000 cy or borrow source change	None	See Note 1	NA
	Gradation	Sieve Analysis	ASTM C136	1 per 10,000 cy or borrow source change	SHS NJDOT, Section 901-08	See Note 1	Reject Material
	Percent Passing No. 200 Sieve	Wet Sieve Analysis	ASTM D1140	1 per 10,000 cy or borrow source change	3-12%	See Note 1	Reject Material
	Lift Thickness	Visual	NA	Random	6" ± 1"	See Note 1	Rework Layer
<b>Turf (02921)</b>							
	Type of Seed	Review of Certification	NA	1 per product	DOA FSA	See Note 1	Reject Material
	Topsoil Composition	Review of Test Results	DOA SSIR	1 per borrow source	NJDA SE & SC, Section 3.5.1	See Note 1	Modify Accordingly with Adjusters, Conditioners, and Fertilizers

Note 1: QC Manager to perform test/inspection.

## **5.0 DOCUMENTATION**

The CQC Plan provides a mechanism to document the construction activities. These documents are utilized by the Construction NTR, Design NTR, Certifying Engineer, QC Manager, and others (i.e., USEPA, NJDEP) to review the adequacy of construction.

### **5.1 Daily Reports**

A Daily Report will be prepared by the RAC's SQCR. This report will provide the chronological framework for identifying and recording all other reports. The Daily Reports will include the following information:

- Date, project name, location, and other identification.
- Description of weather conditions, including temperature, cloud cover, and precipitation.
- A summary of any meetings held and actions recommended or taken.
- Description and location of construction activities.
- Equipment and personnel working on-site including all subcontractors.
- Description of off-site materials received, including any quality verification documentation.
- Calibrations, or recalibrations, of test equipment, including actions taken as a result of recalibration (when applicable).
- Decisions made regarding approval of units of material or of work, and/or corrective actions to be taken in instances of substandard quality.
- Unique identifying sheet numbers of inspection data sheets and/or problem reporting and corrective measures reports used to substantiate the decisions described in the preceding item.
- Signature of the RAC's SQCR.

The Daily Reports will be submitted by the RAC's SQCR to the Construction NTR.

### **5.2 Inspection And Testing Reports**

Inspection and Testing Reports will be prepared by the RAC's SQCR and the QC Manager for their respective inspection and field testing activities. The CQC Inspection and Testing Reports will include the following information:

- Description or title of the inspection activity.
- Date of the inspection and/or testing and personnel involved in the inspection besides the individual preparing the data sheet.

- Location of the inspection activity or action from which a sample was obtained for testing.
- Type of inspection activity and procedure used (reference to standard method when appropriate, such as ASTM, etc.).
- Unique identifying geomembrane sheet number for cross referencing and document control.
- Recorded observation or test data.
- Results of the inspection activity (e.g., pass/fail). Comparison with design requirements.
- Signature of the SQCR and the person performing the reported inspection and/or test, if other than the SQCR.

### **5.3 Weekly Summary Reports**

A Weekly Summary Report will be prepared by the QC Manager summarizing the results of all inspections, QC activities and corrective actions. The Weekly Summary Report will be reviewed and signed by the Certifying Engineer and include the following information:

- Decisions made regarding approval of materials or of work.
- Corrective actions to be taken in instances of substandard or suspect quality.
- CQC test results in support of determination of substandard quality.
- Details and reason for delays that pertain to CQC experienced by the RAC (e.g., RAC, Government, weather, etc.).
- Log and status of and comments on the submittals, RFIs and FCRs received from the RAC.

### **5.4 Problem Identification and Corrective Measures Documents**

A problem is defined as a material or workmanship that does not meet the design criteria, Construction Drawings, and/or Technical Specifications. For each problem a Problem Identification and Corrective Measures document will be prepared and cross-referenced to the specific Daily Report and Weekly Summary Report where the problem was first identified. The Problem Identification and Corrective Measures document will include the following information, as applicable:

- A description of the problem.
- The location of the problem.
- The probable cause of the problem.
- A description of how and when the problem was located.
- An estimate of how long the problem existed.
- Suggested corrective measure(s).
- A documentation of the implementation of the corrective measure(s).
- A description of the final results of the corrective measure(s).
- Suggested methods to prevent similar problems.
- Signature of the QC Manager.
- Signature of the Certifying Engineer.

In certain cases, not all of the above information will be available or applicable. The QC Manager and Certifying Engineer will be aware of any significant recurring problems, determine the cause of the problem, and recommend appropriate changes to prevent recurrence. When this type of evaluation is made, the results will be documented in a brief report to the Construction NTR containing the supporting Problem Identification and Corrective Measures document.

#### 5.4.1 Control of Discrepant and Non-conforming Items

This section describes the procedure for controlling discrepant and non-conforming items.

Discrepant items are those found during inspection to be incomplete, but are correctable by further prescribed processing.

Non-conforming items are those that have been completed, inspected, and accepted, but are subsequently found to deviate from the design documents.

##### 5.4.1.1 Discrepant Items

Items that have been inspected and found in accordance with the design documents are classified as acceptable. Engineering changes that make it necessary to alter these acceptable items by further field action are classified as new work and subject to the same QC requirements as was the original work.

Incomplete items that are discovered during field activities to be discrepant, but which are correctable by further prescribed processing are controlled and documented by the use of Rework Item List (see Appendix A) prepared and maintained by the SQCR and QC Manager. These punch lists describe the discrepancy which must be corrected before the item is completed, inspected, and accepted. Discrepant items that are corrected within the same shift as discovered need not be punch listed, but are reported in the Daily Report.

##### 5.4.1.2 Non-conforming Items

Non-conforming items are controlled and documented by the use of a Non-conformance Report. Nonconformance Reports are prepared as shown by the sample attached in Appendix A.

The verification of corrective actions taken in accordance with the Non-conformance Reports is the responsibility of the SQCR and QC Manager.

The Non-conformance Report is accurately and concisely written by the SQCR after consultation with the interested parties to ensure that the nonconforming item is correctly described, the appropriate program criteria referenced, and sufficient data provided to facilitate proper and complete dispositions to resolve the non-conformity. The QC Manager then validates the Non-Conformance Report and transmits it for review by the Certifying Engineer. Upon receiving the Certifying Engineer's written concurrence, the QC Manager submits the Non-Conformance Report to the Construction NTR and the Design NTR.

Each Non-Conformance Report is given a disposition by the Certifying Engineer and/or the Construction NTR and Design NTR, which is the action required to correct or resolve the non-conformance.



Non-Conformance Reports are dispositioned in one of the following four ways:

- "Rework", which is the action by which a non-conforming item is processed to make it conform to the requirements of the design documents.
- "Repair", which is the action to make a non-conforming item perform its intended use but not necessarily meet all the requirements of the design documents.
- "Reject", which is the action taken to eliminate a non-conforming item from its specified use and replace it with conforming material.
- "Use-As-Is", which is the action taken by the Certifying Engineer to accept an otherwise non-conforming item.

The QC Manager is authorized to make "Rework" and "Reject" dispositions. "Repair" and "Use-As-Is" dispositions are obtained from the Certifying Engineer by means of a Non-Conformance Report. Approval from USEPA and NJDEP is also required for all "Repair" and "Use-As-Is" dispositions.

Upon completion of "Rework" and "Reject" dispositions, the QC Manager makes a re-inspection to determine acceptability.

If the item is found acceptable as the result of the re-inspection, the QC Manager who performed the re-inspection documents his acceptance by signing and dating the Non-Conformance Report.

If the item is found unacceptable during the re-inspection, the SQCR signs, dates and reprocesses the Non-Conformance Report.

If the final disposition is "Reject", the SQCR and QC Manager sign and dates the Non-Conformance Report after ensuring that adequate measures have been taken to prevent the inadvertent use of an unacceptable item.

Information copies of each completed Non-Conformance Report are sent to the Certifying Engineer. Distribution of the Non-Conformance Report is shown on the report.

## **5.5 Documentation And Records Control**

A records management system will be established and implemented to ensure that project documents such as correspondence, procedures, Construction Drawings, Technical Specifications, contract documents, changes to documents, and inspection records will be controlled. The records management system will identify and/or include:

- The documents to be controlled,
- An index and filing method,
- Control logs to identify the document, its subject, identification number, and revision status, if applicable,

- An Action Item List referencing appropriate collateral documents and including provisions for tracking status, and closeout of action items, and
- The responsibility for preparing, reviewing, approving, and issuing documents.

A set of all QC Management and CQC documentation will be kept by the QC Manager and SQCR, respectively, at all times. Records will be retained for the duration of the job then turned over to Northdiv for retention for the minimum of six (6) years as required by USEPA.

## **5.6 Final Report**

At the completion of the project, the Certifying Engineer will submit a Final Report to the Construction NTR. The Final Report will include the following information:

- A detailed narrative summarizing construction, CQC, and QC Manager activities. This narrative will describe the personnel, equipment, and materials involved in each phase of construction and will be illustrated with sketches and selected photographs, as appropriate.
- A discussion of design changes implemented during the course of construction, as may be applicable. For each design change, this discussion will explain the circumstances which lead to the need for a change, describe the change itself, and provide a rationale for the selection of the change.
- Copy of the Weekly Summary Reports prepared by the QC Manager.
- Copy of the results for all field and laboratory CQC and QC Manager tests.
- Copy of all manufacturers' certification documents.
- Red-line Construction Drawings and Technical Specifications documenting design changes during construction.
- As-Built Drawings.
- A formal statement, signed and sealed by the Certifying Engineer, indicating that the landfill cover system as constructed conforms to Construction Drawings, Technical Specifications, and approved design changes.
- Inspection Report by QC Manager.

## **APPENDIX A**

### **FORMS AND REPORTS**

- A.1: Daily CQC Report Form**
- A.2: Weekly Summary Report**
- A.3: RFI/FCR Status Report**
- A.4: Weekly Progress/QC Meeting Minutes**
- A.5: Submittal Transmittal Form**
- A.6: Materials Received Report Form**
- A.7: Geotextile and Geomembrane Inspection Forms**
- A.8: Nonconformance Report**
- A.9: RFI/FCR Forms**
- A.10: Punch List Form**
- A.11: Initial Submittal Register**

<b>FOSTER WHEELER ENVIRONMENTAL CORP.</b>		Project: 1284	Report No:	Page ____ of
<b>CONTRACTOR QUALITY CONTROL</b>		CONTRACT: N62472-94-D-0398		
<b>INSPECTION REPORT</b>		Project: Landfill Sites 4 & 5 at NWS Earle		
Client: U.S. Navy		NAVFAC Spec: 04-93-0285		
Location: Colts Neck, New Jersey		Delivery Order Number: 34		
Subcontractor(s): See Daily Production Report		Visitors to Site: See Daily Production Report		
Date:	Weather:	Temperature: ____ F / ____ F	Precipitation ____ in	
<b>FIELD INSPECTIONS PERFORMED:</b>		Section and Paragraph(s)	V / W / P	
1				
2				
3				
4				
5				
6				
7				
8				
<b>DOCUMENTATION SUBMITTED</b>				
1				
2				
3				
4				
<b>DOCUMENTATION RECEIVED</b>				
1				
2				
3				
4				
<b>REWORK ITEMS IDENTIFIED TODAY</b>	<b>REWORK ITEMS CORRECTED TODAY</b>	<b>DATE IDENTIFIED</b>		
1	1			
2	2			
3	3			
V = Verified - Confirmed by evidence that function or requirements are true W = Witnessed - Personal observation while task(s) or test(s) are performed P = Personal performance of task(s) or function(s)				
<b>CQC REMARKS:</b>				
<p>On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during the reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in the report.</p> <p style="text-align: right;">SIGNED: _____ Peter Mooney</p>				
<b>GOVERNMENT QUALITY ASSURANCE REPORT;</b>				
<b>REMARKS AND / OR EXCEPTIONS TO THIS REPORT:</b>				

FOSTER WHEELER QUALITY CONTROL DAILY REPORT		D.O. 34	REPORT NO:	PAGE __ OF
FIELD INSPECTION NUMBER	IDENTIFICATION OF FIELD INSPECTION	SPECIFICATION SECTION AND PARAGRAPH NO.	PHASE OF CONTROL	METHOD OF INSPECTION
		SECTION:	<input type="checkbox"/> PREPARATORY	<input type="checkbox"/> VERIFIED
			<input type="checkbox"/> INITIAL	<input type="checkbox"/> WITNESSED
		PARAGRAPH :	<input type="checkbox"/> FOLLOW UP	<input type="checkbox"/> PERFORMED
DETAILS OF ACTIVITIES :				
		SECTION:	<input type="checkbox"/> PREPARATORY	<input type="checkbox"/> VERIFIED
			<input type="checkbox"/> INITIAL	<input type="checkbox"/> WITNESSED
		PARAGRAPH:	<input type="checkbox"/> FOLLOW UP	<input type="checkbox"/> PERFORMED
DETAILS OF ACTIVITIES :				
		SECTION:	<input type="checkbox"/> PREPARATORY	<input type="checkbox"/> VERIFIED
			<input type="checkbox"/> INITIAL	<input type="checkbox"/> WITNESSED
		PARAGRAPH:	<input type="checkbox"/> FOLLOW UP	<input type="checkbox"/> PERFORMED
DETAILS OF ACTIVITIES :				

**A/E WEEKLY SUMMARY REPORT  
AREA "A" LANDFILL IRA - CTO 203  
REPORT NO. 13 FOR THE PERIOD MAY 25 THROUGH MAY 31, 1997**

**GENERAL CONSTRUCTION ACTIVITY**

Area 1: Placement of drainage sand over the liner is approximately 90% complete. Woven geotextile and base course continued to be installed over approved sections of the drainage sand.

Area 2: Gas management sand and gas management pipe installation is nearly complete. Channels A and E have been backfilled with cohesive backfill to Culvert 1. GCL and LDPE liner installation began over the western portion of the area.

Area 3: Subgrade preparation continued throughout the week. Test pits were excavated along Channel A between Culverts 1 and 2 to search for the presence of landfill material beyond the final limit of landfill material. Landfill material was encountered between Station 20+00 and Culvert 2. The landfill material was excavated over a 200 foot section to four feet below subgrade. The excavation will be backfilled with low permeability soil.

Area 4: Additional GCL and LDPE liner were deployed over the Channel C sideslope. Drainage sand was spread over the completed section of liner. Installation of the woven geotextile and base course material began over the plateau this week.

General: Cohesive backfill, drainage sand and base course material was delivered to the site during the week. Survey support was ongoing during the week. The sidewalk guy wire was installed by Dicin Electric at the southern limit of IR Site 4.

**STATUS OF CQA TESTING AND INSPECTION**

CQA inspection of the subgrade preparation in Area 3 continued throughout the week.

CQA inspection of the GCL and LDPE liner installation in Areas 1 and 2 continued throughout the week. The Certifying Engineer was onsite to observe the installation.

Sand cone density testing of the gas management sand and drainage sand yielded similar results to those taken by the nuclear densiometer.

The second CQA destructive sample was sent to GeoTesting Express for peel and shear strength analysis. The test results are pending. Samples of drainage sand and base course were sent to the laboratory for geotechnical testing.

Field inspection of the geotextile seams was ongoing throughout the week.

**DELAYS IN SCHEDULE**

Foster Wheeler is approximately two days behind the baseline schedule. No construction delays were incurred this week.

**STATUS OF SUBMITTALS**

The following submittals were submitted for A/E review during this period:

- No. 055 - Geomembrane Interface Friction Tests.
- No. 056 - Geomembrane and GCL Installation Reports.
- No. 057 - Construction Phase Testing of Cohesive Backfill.
- No. 058 - Construction Phase Testing of Drainage/Gas Management Sand.

The following approved submittals were returned by the ROICC during this period:

- No. 050 - Geomembrane Resin and Roll Data.
- No. 051 - Construction Phase Testing of Drainage/Gas Management Sand.
- No. 052 - Non-Woven & Woven Geotextile Properties Tests.
- No. 055 - Geomembrane Interface Friction Tests.
- No. 056 - Geomembrane and GCL Installation Reports.

**STATUS OF RFI**

The following RFI's were submitted during this period. See Table 1 for the list and status of RFI's that have been submitted throughout the project.

- No. 019 - Request to Place Drainage Sand at a Minimum Density of 106 pcf in Order to Comply With the Permeability Specification.

**STATUS OF FCR**

The following FCR's were submitted during this period. See Table 2 for the list and status of FCR's that have been submitted throughout the project.

None.

**COMMENTS**

The first two CQA permeability test results for the gas management/drainage sand have yielded slower permeability's than the CQC tests for the same material under similar conditions. To accurately determine the differences between the two laboratories, a split sample of the material was taken this week for permeability analysis under the same density and moisture conditions. The test reports from both laboratories will be reviewed upon receipt to determine any variation in the testing procedures that may be the cause of the varying results.

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Bryan Conley  
CQA Field Engineer

**TABLE 5-1**  
**SUMMARY OF REQUEST FOR INFORMATION (RFI) FORMS**  
**AREA A LANDFILL INTERIM REMEDIAL ACTION**  
**NSB-NLON GROTON, CONNECTICUT**

RFI#	SUBJECT	RESPONSE	RESPONSE DATE
1	Elevation of survey station #217.	Provided	1/24/97
2	Number of monitoring wells to abandon.	Provided w/comment	4/29/97
3	Decommissioning of the existing utilities along the southern limit of work.	Approved w/comment	2/2/97
4	Substitution of ADS pipe for HDPE pipe.	Re-submitted as FCR #3	3/11/97
5	Modification to the LDPE and GCL specification.	Re-submitted as FCR #4	3/11/97
6	Modification of the LDPE/GCL anchor trench.	Re-submitted as FCR #5	3/11/97
7	Use of a refurbished transformer in place of a new one.	Approved w/comment	3/24/97
8	Use of single leaf handhole covers.	Approved	4/16/97
9	Request to cut tires in half and place in the fill.	Approved w/comment	4/28/97
10	Request for the circuit number for the 5kV cable.	Provided	4/23/97
11	Use of overhead aluminum cable as installed.	Approved	4/23/97
12	Modification of Channels B, C and D sideslopes.	Approved	5/2/97
13	Modification of Channel A detail.	Approved	5/12/97
14	Reduction in sand conformance testing.	Approved	5/15/97
15	Reduction in the compaction of the gas management sand from 70% to 60% relative density.	Approved	5/19/97
16	Request for ten day liner exposure period.	Approved	5/19/97
17	Replace 24 gauge with 26 gauge on buildings.	Approved	5/21/97
18	Omit the synthetic bags around the pipe flanges.	Approved	5/22/97
19	Placement of drainage sand at a minimum of 106 pcf.	Re-Submitted as FCR #17	6/25/97
20	Permanent mounting of the transformer.	Approved	6/30/97
21	Use of new fixtures for the deployed parking lot.	Approved	7/31/97
22	Silt fence removal plan.	Approved	7/22/97
23	Omit grounding the deployed parking lot gate.	Disapproved	9/5/97



**TABLE 5-2**  
**SUMMARY OF FIELD CHANGE REQUEST (FCR) FORMS**  
**AREA A LANDFILL INTERIM REMEDIAL ACTION**  
**NSB-NLON GROTON, CONNECTICUT**

FCR#	SUBJECT	RESPONSE	RESPONSE DATE
1	Unsuitable subgrade in Area 4.	Approved w/comment	3/21/97
2	Stockpiling material on the landfill surface.	Rejected	3/21/97
2A	Stockpiling gas management sand on site.	Approved	4/17/97
3	Use of ADS pipe in place of HDPE pipe.	Rejected	3/21/97
4	Modification to the LDPE and GCL specification.	GCL and smooth LDPE approved; Textured LDPE rejected	3/21/97
5	Modification of the LDPE/GCL anchor trench.	Approved	3/21/97
6	Geotechnical testing of the IR Site 4 material.	Approved	3/21/97
7	Classification testing of common and select fill.	Approved	3/21/97
8	Reduction in the depth of the gabion baskets.	Rejected	3/27/97
9	Modification of the elliptical pipe size/joints.	Approved	4/10/97
10	Use of flowable fill to abandon existing RCP's	Approved	4/17/97
11	Protection of the gas vents above the asphalt.	Resubmit	5/1/97
11A	Protection of the gas vents above the asphalt.	Approved	5/5/97
12	Modification of the low permeability specification.	Approved	5/20/97
13	Stockpiling drainage/base course on site.	Approved	5/15/97
14	Modification of the Channel E bedrock tie-in.	Approved	6/2/97
15	Use of Class 1 asphalt in place of Class 2.	Approved	6/30/97
16	Elimination of the south slope drainage swale.	Approved	6/30/97
17	Placement of drainage sand at 106 pcf.	Approved	6/30/97
18	Replacing the modified riprap with gabion stone.	Approved	7/16/97
19	Salt storage building partition wall addition.	Approved	10/14/97
20	Electrical installations at the MAA Building.	Approved	10/14/97

**AREA "A" LANDFILL CAP CONSTRUCTION  
SUBASE GROTON, CT**

**WEEKLY PROGRESS MEETING MINUTES**

**FOR THE WEEK ENDING MAY 24, 1997**

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**DISTRIBUTION:**

Jim Briggs, NORTHDIV  
Mark Evans, NORTHDIV  
John McGrath, NORTHDIV  
Lt. Mark Wiersma, NSB-NLON  
Bill Hayward, NSB-NLON  
Andrew Stackpole, NSB-NLON  
Kymberlee Keckler, USEPA Region 1  
Mark Lewis, CTDEP  
Jean-Luc Glorieux, B&RE  
Douglas Cervenak, B&RE  
Bryan Conley, B&RE  
File 5082-3.3

Carl Tippmann, FWENC  
Dan Sullivan, FWENC  
Lyn Stewart, FWENC  
Peter Mooney, FWENC  
Michelle Pagano, FWENC

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The 12<sup>th</sup> weekly progress meeting began at 1430 hours on May 22, 1997, in the site trailer at the Area "A" Landfill.

**ATTENDEES:**

Lt. Mark Wiersma  
Dan Sullivan  
Lyn Stewart  
Peter Mooney  
Michelle Pagano  
Bryan Conley

ROICC  
FWENC  
FWENC  
FWENC  
FWENC  
B&RE

Construction NTR  
Site Superintendent  
Project Engineer  
Construction QC  
Project Controls  
CQA Field Engineer

## I. WORK ACCOMPLISHED

1. Construction of the drainage layer has been completed over the lined portion of Area 4. Density testing of the drainage sand is in progress.
2. Deployment of the GCL and LDPE was completed in Area 1. Quality control testing of the deployed liner is nearly complete. Placement of drainage sand, woven geotextile and base course began this week.
3. Placement of gas management sand in Area 2 is approximately 90% complete. Installation of the gas management piping is about 80% complete. Installation of the non-woven geotextile and cohesive backfill has been completed to the 18" RCP discharge. The Channel A subgrade excavation has been completed to Culvert 1. Cohesive backfill has been installed in the excavation to Station 16+00.
4. Subgrade preparation continues in Area 3. Channel A has been constructed between Culverts 1 and 2.
5. An additional 5 feet of soil was excavated south of Channel E in search of bedrock. Minimal bedrock was encountered during the excavation. Construction of Channel E will continue upon receipt of a response to FCR 14.
6. Cohesive backfill and drainage sand deliveries continue to arrive onsite.
7. Survey support continued throughout the week.

## II. WORK PLANNED

The following work items are scheduled to occur within the next two weeks:

1. Install the woven geotextile in Area 4 and begin to construct the base course layer.
2. Begin to construct and install the gabion baskets in Area 4.
3. Complete the drainage layer in Area 1 and continue to install the woven geotextile and base course.
4. Complete the gas management layer in Area 2 and begin to deploy GCL and LDPE liner.
5. Complete placement of the cohesive backfill in the Area 2 section of Channel A.
6. Begin placing cohesive backfill in Channel E if FCR 14 is approved.
7. Begin to construct Culvert 1.
8. Continue the subgrade preparation in Area 3. Begin to install the gas management sand and gas management piping on the plateau area and the non-woven geotextile and cohesive backfill on the north slope.
9. Begin to place cohesive backfill in the Area 3 section of Channel A.

## III. GENERAL MINUTES

1. FCR 14 has been submitted to the Navy for review and forwarding to the regulatory agencies for approval. Brown & Root will check on the status of the FCR so Foster Wheeler can continue to construct Channel E.
2. Additional confirmation samples in IR Site 4 will most likely not be taken since the majority of the soil has already been removed. Brown & Root will confirm this with the Navy.
3. The volume of soil remaining to be placed in Area 3 appears to be at least 1,000 CY less than the 3,500 CY that the regrading plan was designed to accommodate. ROICC will find out if any of the other sites around the base have a small amount of contaminated soil that could be incorporated into the landfill subgrade prior to closure.
4. The Channel C sideslope along the west slope of Area 4 will not be required to have the Nicolon HS 1150 woven geotextile placed. The TNS woven geotextile will be installed instead. The reasoning behind the decision was that the sideslope will not be part of the deployed parking lot and settlement should not be a major issue. The TNS material has one fourth the strength of the Nicolon material.
5. ROICC noted that sandbags at the Wahoo gate should remain accessible to the Navy since it is hurricane season. Access to the sandbags is presently clear.
6. Hauling of drainage sand over Hospital Hill has proceeded throughout the week without incidents or complaints.
7. Foster Wheeler is sending a letter of intent to their building vendor to provide the preengineered metal buildings. The estimated delivery time is 10 weeks. ROICC will expedite the review and approval of the submittals by the Navy.

#### IV. SCHEDULE REVIEW

- The overall project is currently two days behind the baseline schedule.

#### V. SUBMITTAL

The following submittals were submitted for A/E review during this period:

- No. 050 - Geomembrane Resin and Roll Data.
- No. 051 - Construction Phase Testing of Drainage/Gas Management Sand.
- No. 052 - Non-Woven & Woven Geotextile Properties Tests.
- No. 053 - GCL MQA/MQC Data.
- No. 054 - Geomembrane and GCL Installation Reports.

The following approved submittals were returned by the ROICC during this period:

- No. 012B - Geosynthetic Installer's Qualifications.
- No. 045 - Construction Phase Testing of In-Place Soil Density.
- No. 046 - GCL MQA/MQC Data.
- No. 047 - GCL MQA/MQC Data.
- No. 048 - Construction Phase Testing of Onsite Common Fill.
- No. 049 - Construction Phase Testing of Cohesive Backfill.

The following RFI's were submitted during this period:

- No. 015 - Request to Reduce the Relative Density Testing Requirement From 70% to 60%.
- No. 016 - Request for Ten Days of Exposure on the LDPE Liner Prior to Covering.
- No. 017 - Use of 28 Gauge Material to Construct the Gutters, Trim and Downspouts for the Preengineered Metal Buildings.
- No. 018 - Elimination of the Synthetic Bags Around the Gas Management Pipe Flanges.

The following FCR's were submitted during this period:

- No. 014 - Modification of the Channel E Bedrock Intercept Tie-In Detail.

#### VI. QUALITY ISSUES

- Foster Wheeler has been placing the drainage sand to the densities that have been proven to meet the specified permeability for the drainage layer. An RFI will be submitted to request a reduction of the 70% relative density compaction requirement to allow the soil to be placed at a lower density to meet the specified permeability.
- Foster Wheeler has performed an additional interface friction test on the textured liner to drainage sand interface to prove that the drainage sand can be placed at a lower density with an acceptable factor of safety against sliding. The results will be submitted for A/E review.

#### VII. COST STATUS

The project currently remains on budget.

#### VIII. SPECIAL INTEREST ITEMS

- The installation of GCL and LDPE liner in Area 2 is scheduled for the week of May 26, 1997.
- Installation of the gabions in Area 4 is scheduled to begin during the week of May 26, 1997.

#### IX. MEETING MINUTE REVISIONS

It was noted that Jim Briggs (NorthDiv) attended the May 15, 1997 progress meeting via telephone.

CONTRACT NO. N62472-D-0398	DELIVERY ORDER NO. 0034	ACTIVITY LOCATION NWS EARLE, COLTS NECK, NEW JERSEY
PROJECT TITLE: SITES 4 & 5 LANDFILL CAPS		
FROM: FOSTER WHEELER ENVIRONMENTAL / CQC PETER MOONEY		DATE 31 DECEMBER 97
TO: TOM DUNN, ROICC		DATE 31 DECEMBER 97

1. THE CONTRACTOR SUBMITTALS LISTED BELOW ARE FORWARDED FOR YOUR:

- ☐ APPROVAL, APPLY APPROPRIATE STAMP IMPRINT TO EACH SUBMITTAL, RETAIN ONE (1) COPY OF THIS TRANSMITTAL FORM.
- ☐ REVIEW & COMMENT, RETURN REVIEWED COMMENT COPIES.
- ☐ INFORMATION ONLY.

2. SUBMITTALS SHOULD BE RETURNED BY (DATE) \_\_\_\_\_

☐ NO RETURN REQUIRED

RETURN TO: ☐ ROICC ☐ FOSTER WHEELER ENVIRONMENTAL ☐ OTHER \_\_\_\_\_

3. APPROVAL REQUIRED BY:

☐ NORTHDIV ☐ ROICC ☐ CQC ☐ OTHER \_\_\_\_\_

COPY TO:

☐ ROICC ☐ NORTHDIV ☐ OTHER  
TOM DUNN (2 COPIES) PAUL BRIEGEL

SIGNATURE AND DATE

FROM	APPROVING AUTHORITY (#3 ABOVE)	DATE
TO	TOM DUNN, ROICC	DATE

1. THESE SUBMITTALS LISTED BELOW HAVE BEEN REVIEWED AND ARE RETURNED, WITH ACTION TAKEN AS INDICATED.

2. \_\_\_\_\_

COPY TO:

☐ ROICC ☐ DESIGNER ☐ OTHER

SIGNATURE AND DATE

FROM	TOM DUNN, ROICC	DATE
TO	FOSTER WHEELER ENVIRONMENTAL CORPORATION CONTRACTOR	DATE

1. THE SUBMITTALS LISTED BELOW HAVE BEEN REVIEWED AND ARE APPROVED/DISAPPROVED AS SHOWN BELOW AND ON

EACH STAMP IMPRINT.

COPY TO:

☐ CONTRACTOR - FOSTER WHEELER ENVIRONMENTAL ☐ OTHER

FOR COMMANDING OFFICER,  
NORTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
DATE

ITEM NO.	SUBMITTAL DESCRIPTION	PREPARED/SUBMITTED BY	APPROVED	DISAPPROVED	REMARKS
100	Riprap Gradations SD-12, Field Test Reports Spec. Sec 02315 /2.3.2	Peter Mooney			

# FOSTER WHEELER ENVIRONMENTAL CORPORATION

## MATERIAL RECEIVED REPORT CAP COMPONENT :

CONTRACT #: N62472-93-D-0285 D.O.34

PROJECT NAME: Sites 4 & 5 Landfill Caps, Naval Weapons Station, Colts Neck, New Jersey

VENDOR:

DATE RECEIVED:

SPEC. SECTION:

SUBMITTAL #:

ITEM #	SPEC. PARA.	DESCRIPTION	AMOUNT	STATUS

STATUS KEY:

C = COMFORMS WITH REQUIREMENTS

NC = DOES NOT CONFORM WITH REQUIREMENTS (EXPLANATION REQUIRED)

**GEOTEXTILE  
FIELD INSPECTION FORM  
AREA A LANDFILL**

**LOCATION**

Woven:

Non-woven:

Panel Layout on Back:

**SUBSTRATE INSPECTION**

Substrate Material:

Acceptable:

Unacceptable:

Deficiency:

Comments:

**MATERIAL INSPECTION**

Visual Inspection:

Acceptable:

Unacceptable:

Comments:

**METHOD OF PLACEMENT**

Deployment Method:

Comments:

**SEAM INSPECTION**

Sewing Machine Number:

Total Seam Length:

Edge to Seam Limit (2-inch min.):

Acceptable:

Unacceptable:

**REPAIR INSPECTION**

Location:

Patch Size:

Comments:

Title

Date

C-QC Inspector

Title

Date

## GEOMEMBRANE PANEL LOG

[illegible]



# GEOMEMBRANE PANEL DEPLOYMENT LOG

<b>PROJECT:</b>	Area A Landfill	<b>CONTRACTOR:</b>	Foster Wheeler Envir.
<b>LOCATION:</b>	Groton, Connecticut	<b>INSTALLER:</b>	Foster Wheeler Envir.
<b>JOB NO.:</b>	5082		

Date:	Page No.
Geomembrane:	
Subgrade Condition:	
Deployment Method:	
Comments:	

Description	Panel Number	Panel Number	Panel Number
Roll Number			
Ambient Air Temp.			
Weather Cond.			
Visual Observation			
Overlap			
Monitor			
Ballasting			
Comments			

Description	Panel Number	Panel Number	Panel Number
Roll Number			
Ambient Air Temp.			
Weather Cond.			
Visual Observation			
Overlap			
Monitor			
Ballasting			
Comments			

Description	Panel Number	Panel Number	Panel Number
Roll Number			
Ambient Air Temp.			
Weather Cond.			
Visual Observation			
Overlap			
Monitor			
Ballasting			
Comments			

## GEOMEMBRANE DESTRUCTIVE SAMPLE LOG

[illegible]

**NONCONFORMANCE REPORT  
LANDFILL SITES 4 & 5**

To Officer In Charge of Navy Contracts

Date:

Naval Weapon Station Earle  
Colts Neck , New Jersey

Attn: Tom Dunn, ROICC

From:

References:

**NONCONFORMANCE DESCRIPTION:**

**ACTION REQUIRED:**

Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**DISPOSITION:**

Name: \_\_\_\_\_  
Title: \_\_\_\_\_

Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**Foster Wheeler Environmental Corporation**  
**Change Request Form**

Section 1 through 4 to be filled out by Foster Wheeler, Section 5 to be filled out by Navy

PROJECT: <b>Navy RAC D.O.</b>	OFS.No. <b>1284-00</b>	Change Request Form: <b>CRF- Rev.</b>
-------------------------------	---------------------------	--

To: \_\_\_\_\_ Dept. \_\_\_\_\_ Location: \_\_\_\_\_ Date: \_\_\_\_\_

Re: ☐ Drawing No. \_\_\_\_\_ Title \_\_\_\_\_

☐ Spec. No. \_\_\_\_\_ Title \_\_\_\_\_

☐ Other \_\_\_\_\_

1. DESCRIPTION (*Items involved, submit sketch if applicable*) \_\_\_\_\_

2. REASONS FOR CHANGE (*If from disposition of nonconformance report, list report number*) \_\_\_\_\_

3. RECOMMENDED DISPOSITION

- ☐ Technical Clarification [NTR approval required]
- ☐ Out of Scope [CO/COTR approval required]
- ☐ Cost Growth
- ☐ ROM Estimate (If Applicable) \$ \_\_\_\_\_
- ☐ Schedule Impact \_\_\_\_\_

**FWENC Initiator (Signature/Title):** \_\_\_\_\_

4. FWENC Project Manager (Signature)	Date	Project Superintendent Concurrence (Signature)	Date
--------------------------------------	------	--	------

5. NAVY DISPOSITION

- ☐ Approved per recommended disposition
- ☐ Not approved (give reason)
- ☐ Approved with modification(s) [describe below]

NTR Concurrence (Signature)	Date	ROICC Concurrence (Signature)	Date
Contracting Officer Technical Representative Approval (Signature)		Contracting Officer Approval (Signature)	Date

Engineer signs and transmits to Resident Engineer with copies to:

_____ Project Manager	_____ Others as Required
_____ Project Superintendent	_____ File:
_____ Quality Control	_____

# PUNCH LIST

PAGE NO. \_\_\_\_\_

ITEM NO.	DATE	DESCRIPTION	SPEC./DRWG. REFERENCE	DATE CORRECTED	ENGINEER SIGN-OFF

## SUBMITTAL REGISTER

Contract Number: N62472-94-D-0398 D.O. # 0034Project Title: Landfill Caps for Sites 4 and 5LOCATION: NWS-Earle, NJ

CONTRACTOR: Foster Wheeler Environmental Corporation

CONTRACTOR ACTION									APPROVING AUTHORITY ACTION					CONTR	
SPEC SECTION NO.	SD NO. & TYPE OF SUBMITTAL-MATL OR PRODUCT	SPEC PARA NO	CLASSIF/ APPR BY CO *	GOVT OR A/E REVR	TRANS CONTL NO.	PLANNED SUBMITTAL DATE	ACT. CODE	DATE OF ACTION	DATE FWD TO APPR AUTH / DATE RECD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RECD FROM OTHER REVIEWER	ACT. CODE	DATE OF ACTION	MAILED TO CONTR / RECD FROM APPR AUTH	REMARKS
(a)	(b)	(c)	(D)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
02142	SD-02, Manufacturer's Catalog Data														
	VFPE Geomembrane	2.1	G			2/14/98									
	SD-04, Drawings														
	Panel Layout	1.2.2.1	G			2/14/98									
	SD-06, Instructions														
	VFPE Geomembrane	2.1	G			2/14/98									
	SD-08, Statements														
	Manufacturer's Qualifications	1.4.1	G			2/14/98									
	Installer's Qualifications	1.4.2	G			2/1/98									
	Manufacturer's Warranty	1.5.1	G			5/1/98									
	SD-10, Test Reports														
	Shear Test Requirements	1.2.5.1	G			2/28/98									
	SD-12, Field Test Reports														
	Field Technical Service Reports	1.2.6.1	G			As Placed									
	SD-13, Certificates														
	VFPE Geomembrane	2.1	G			2/14/98									
	Site Preparation	1.2.7.2	G			As Placed									
	SD-14, Samples														
	VFPE Geomembrane	2.1	G			2/14/98									

## ACTION CODES:

NR: Not Reviewed

AN: Approved as Noted

A: Approved

RR: Disapproved; Revise and Resubmit (Others may be prescribed by the Transmittal Form)

## \* Navy Notes:

Approved by:

G: Contracting Officer

Blank: CQC Manager

## \* NASA Notes:

Approved by:

Blank: Contracting Officer

## \* Army Notes:

Classification:

GA: Gov't Approval

FIO: For Infor ONLY

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02143	SD-02, Manufacturer's Catalog Data														
	Polyvinyl Chloride (PVC) Plastic	2.1				2/1/98									
	Pipe and Fittings														
	SD-06, Instructions														
	Installation	3.1.1				2/1/98									
02220	SD-08, Statements														
02272	SD-02, Manufacturer's Catalog Data														
	Non-woven Cushion Material	2.1.1.1	G			2/21/98									
	Roadway Stabilization Fabric	2.1.1.2	G			3/10/98									
	Non-woven Geotextile	2.1.1.3	G			3/3/98									
	SD-06, Instructions														
	Manufacturing, Sampling and Testing	2.2.1				3/3/98									
	SD-13, Certificates														
	Non-woven Cushion Material	2.1.1.1	G			3/25/98									
	Roadway Stabilization Fabric	2.1.1.2	G			5/1/98									
	Non-woven Geotextile	2.1.1.3	G			4/2/98									
	SD-14, Samples														
	Non-woven Cushion Material	2.1.1.1				2/21/98									
	Roadway Stabilization Fabric	2.1.1.2				3/10/98									

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	Non-woven Geotextile	2.1.1.3				3/3/98									
02315	SD-11, Factory Test Reports														
	Acid Producing Soil Test	2.2.1.1				3/30/98									
	SD-12, Field Test Reports														
	Select Fill/Backfill	3.9.2.1				2/7/98									
	Granular Material	3.9.2.2				2/14/98									
	Density Tests	3.9.2.3				As Placed									
02524	SD-12, Field Test Reports														
	Well Abandonment Form	3.1	G			As Placed									
02524	SD-13, Certificates														
	Casing	2.1.2				3/3/98									
	Cement	2.1.5				3/3/98									
02530	SD-02, Manufacturer's Catalog Data														
	Pipeline materials	2.1	G			4/14/98									
	Tank Materials	2.2	G			4/14/98									
	SD-04 Drawings														
	Holding Tank	2.2.1	G			4/14/98									
	SD-05 Design Data														
	Design Calculations	1.3.3.1	G			4/14/98									
	SD-12 Field Test Reports														

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(a)	(b)	(c)	(D)	(e)	(f)	(g)	(h)	(I)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	Leakage Testing	3.2.2.1	G			As Laid									
02582	SD-02 Manufacturer's Catalog Data														
	Precast Concrete Structures	2.1.3.1	G			3/26/98									
	Frames and Covers	2.1.1.2	G			3/26/98									
	Frames and Covers	2.1.3.2	G			3/26/98									
	Sealing Material	2.1.3.1	G			3/26/98									
	Cable racks, Arms & Insulators	2.1.2	G			3/26/98									
	SD-04 Drawings														
	Precast Handhole	1.3.2.1	G			3/26/98									
	Pulling-in Irons	3.1.4.3	G			3/26/98									
02631	SD-02 Manufacturer's Catalog Data														
	Corrugated Plastic Piping	2.1.1				2/1/98									
02741	SD-08 Statements														
	Mix Delivery Record	1.2.1.1				As Placed									
	Asphalt Concrete	2.1				4/21/98									
02741	SD-11 Factory Test Reports														
	Trial Batch	1.2.2.1				4/21/98									
	Mix Design	1.2.2.2				4/21/98									
	SD-12 Field Test Reports														
	Asphalt Concrete	2.1				As Placed									

\* Navy Notes:  
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(a)	(b)	(c)	(D)	(e)	(f)	(g)	(h)	(I)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	Density	3.2.2.2				As Placed									
	Density	3.3.2.3				As Placed									
	Thickness	3.3.2.2				As Placed									
	Thickness	3.3.2.3				As Placed									
	Straightedge Test	3.3.2.2				As Placed									
	SD-13, Certificates														
	Asphalt Concrete	2.1				As Used									
	Curbs	2.3				As Used									
	SD-14 Samples														
	Uncompacted Mix	3.3.2.1				As Used									
	Cores	3.2				As Used									
02921	SD-02 Manufacturer's Catalog Data														
	Fertilizer	2.5				3/21/98									
	SD-07 Schedules														
	Seed	2.1				3/21/98									
	SD-10 Test Reports														
	Topsoil Composition Tests	1.3.3.1				3/21/98									
	SD-11 Factory Test Reports														
	Acid Producing Soil Test	2.2.1.1				3/21/98									
02951	SD-07 Schedules														

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03300	Nursery Certifications	2.1.1				3/28/98									
	SD-06 Instructions														
	Liquid Membrane Forming Compounds	2.3.2				3/28/98									
16301	SD-13 Certificates														
	Concrete	2.1				As Used									
	SD-01 Data														
	Tested Transformer Losses	2.5.2	G			3/21/98									
	SD-02 Manufacturer's Catalog Data														
	Transformer	2.5	G			3/21/98									
	SD-11 Factory Test Reports														
	Routine and Other Tests	2.8.2	G			3/21/98									
	SD-12 Field Test Reports														
	Acceptance Checks & Tests	3.2.1	G			AS Installed									
	Ground Resistance Test Reports	1.4.4.1	G			As Installed									
	SD-18 Records														
16400	Transformer Test Schedules	2.8.1	G			3/21/98									
	SD-02 Manufacturer's Catalog Data														
	Panelboard	2.1				3/21/98									
	SD-04 Drawings														

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(a)	(b)	(c)	(D)	(e)	(f)	(g)	(h)	(I)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	Panelboard	2.1				3/21/98									
	SD-18 Records														
	Service & Distribution	1.2.3.1				As Installed									
16403	SD-02 Manufacturer's Catalog Data														
	Wires & Cables	2.1				3/21/98									
	Conduit	2.3				3/21/98									
	Conduit Fittings	2.4				3/21/98									
16403	Ground Rods	2.5				3/21/98									
	SD-12 Field Test Reports														
	Cable Test	3.2.1				As Installed									
16524	SD-02 Manufacturer's Catalog Data														
	Lighting Fixtures	2.1				3/21/98									
	SD-04 Drawings														
	Installation Details	1.2.2.1				3/21/98									
	SD-12 Field Test Reports														
	Operational Test	3.2				As Installed									

\* Navy Notes:  
Approved by:  
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